A BIOGRAPHICAL MEMOIR OF SAMUEL HARTLIB.

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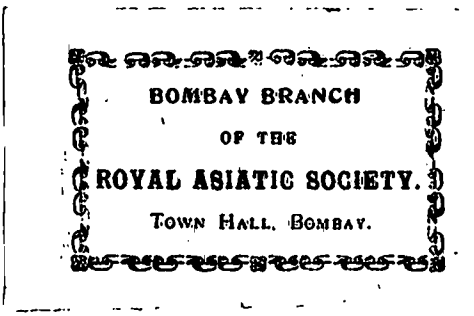

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LIFE OF

SAMUEL HARTLIB,

ACCOUNT OF HIS

PUBLICATIONS,

AND REPRINT OF

An Invention of Engines of Motion.

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A

Biographical Memoir

OF

SAMUEL HARTLIB,

MILTON'S FAMILIAR FRIEND;

WITH

BIBLIOGRAPHICAL NOTICES
OF WORKS PUBLISHED
BY HIM;

AND

A REPRINT OF HIS PAMPHLET

ENTITLED

"An Invention of Engines of Motion."

BY H. DIRCKS, LL.D.

AUTHOR OF THE LIFE AND TIMES OF THE MARQUIS OF WORCESTER, &c. &c.

There be many that say, who will shew us any good?—*Psalms.*

London:

JOHN RUSSELL SMITH,

36, Soho Square, London, W.

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TO

BENNET WOODCROFT, Esq. F.R.S.

LATE PROFESSOR OF MACHINERY IN THE LONDON UNIVERSITY,

ASSISTANT TO THE COMMISSIONERS OF PATENTS,

ETC., ETC., ETC.

Dear Sir,

An acquaintance of one quarter of a century emboldens me to inscribe to you my present work relating to Samuel Hartlib's life and publications. I acknowledge it forms but a small memento of friendship, yet it enables me publicly to declare my sincere estimation of your character, and satisfaction that you occupy a government position, in which you are emphatically "the right man in the right place."

As the founder of the Patent Office Museum at South Kensington you have rendered an essential service to inventors, by fully informing them through its medium in respect to what has been done to effect improvements in various arts and manufactures; as well as thereby to encourage and stimulate advancement, by popularising a knowledge of the best and most approved manufactures. We have thus before us in a palpable form the historic page of the progress of our country in

those great inventions which have mainly contributed to its present commercial wealth and importance.

What Samuel Hartlib attempted for the advancement of Society in a religious and moral point of view, in the seventeenth century, by the establishment of suitable institutions, you, in another department of social progress, have carried to a successful issue at this present time; and it is therefore my sincere hope that your valuable life will be long spared to enable you to complete, if not to perfect, the scheme you have so ably commenced for the furtherance of national improvement in those arts that largely conduce to peace, plenty, and civilization. Believe me,

Dear Sir,

Your very sincere friend,

HENRY DIRCKS.

Blackheath, Kent,
January, 1865.

PREFACE.

READERS conversant with the historic periods of Charles the First, the Commonwealth, and the restoration of monarchical government, cannot fail to have met with frequent notices of Samuel Hartlib: a man universally respected during the period in which he flourished, and one whose activity in spreading knowledge, and whose zeal in doing good, had their influence in mitigating the severe pressure of those terrible times. His biography offers one among the too many examples of the wreck, dispersion, and oblivion consequent on civil discord; like a shattered vase or broken statue the precious fragments become with time but more scattered, and less available for reproduction. The monumental gallery left us, after the ravages of civil commotion, affords striking evidences of the savagery of war, and its fearfully brutalizing influence. It is amidst the relics of the past that, in peaceful times, the biographer has to search for some remnants sacred to the noble spirits of a past age, and to select and arrange as best he can the meagre remains that

reward his dreary labours. But the memory of men like Hartlib, survives every convulsion, for great and good works, blest with a life beyond life, serve to all time, to influence and stimulate others in following like paths of usefulness.

It was while engaged on his Life of the Marquis of Worcester, that the author was led to inquire into the merits of a pamphlet published by Samuel Hartlib, being the substance of two letters addressed to him, by a nameless correspondent, respecting his *Invention of Engines of Motion.* Finding that Henry Lord Herbert, the son of the Marquis, had been in communication with Hartlib, the inquiry was pursued further than had been originally contemplated: which was principally increased by a desire to trace the authorship of the pamphlet in question. While this remained doubtful, it seemed not unlikely that the Marquis of Worcester himself, as well as his son, might have been intimate with the universal correspondent. Thus led step by step to secure information at every stage of the inquiry—a mass of interesting matter was accumulated respecting Hartlib himself; which it was thought might excite some attention and gratify the modern reader, if accompanied by a reprint of the scarce pamphlet that had originated the inquiry into his life.

In a literary point of view it was important to establish the true authorship of the work, and for this we now have its publisher's own statement. Scientifi-

cally considered it is valuable, seeing that notices of it have (very needlessly) been considered as requisite in tracing the history of the steam engine, to which it has not the most remote relation, and from which it will doubtless, in future, be excluded by all intelligent writers.

It is a little remarkable that no fuller account of the Life of Samuel Hartlib is to be found than is supplied by the brief compilations in popular biographies, with occasional notices in bibliographical works and magazines. Yet in the early portion of the 17th century John Evelyn had been solicited to supply necessary information for a biography; and later, Mr. Todd observed in his Life of Milton that it was a desideratum in our literature. Warton likewise declares that Hartlib deserved well of the public; and the Rev. Walter Harte, in his *Essays on Agriculture*, acknowledges his great merits. Sir Egerton Brydges also made an attempt to promote an interest in this inquiry. He is likewise favourably noticed in *Tracts on Practical Agriculture and Gardening*; by A Country Gentleman; 8vo. 1768, and in *A history of English Gardening*, chronologically arranged, 8vo. 1829. And later writers have not been wanting to express the satisfaction which collected information would afford. Mr. James Crossley, in editing "The Diary and Correspondence of Dr. John Worthington," published by the Chetham Society in 1847, has preserved many of Hartlib's letters, and

offered many valuable comments on their contents, together with notices of several of his publications.

Other materials for a fuller biographical account are to be found among numerous letters in the British Museum. Ayscough's Catalogue refers to a "Collection of Letters and Papers relating to the embassy of Mr. Pell, Hartlib, Durie, and others to Dantzick, to settle differences in religion," also Volumes of extracts of Letters addressed to him, and among the rest, "A phytological letter," none of which appear in the present work. And the Index to the Additional Manuscripts, 1782-1835, affords references to his Petition, Correspondence, and account of himself.

The last volume of the works of the Honourable Robert Boyle, also contains a large collection of letters written to him by Hartlib.

There is a brief notice of him and his works, by Professor Donaldson, in his excellent *Agricultural Biography*, 8vo. 1854. Commenting on the profligacy of the restored monarchy and Hartlib's humiliating circumstances, he remarks, "These are painful reflections, and put to shame every boast of civilized life."

The present memoir offers only a very brief sketch of the literary and patriotic career of Samuel Hartlib, yet it is a much fuller account than any hitherto offered to the public; and it is quite possible that further research may bring to light much interesting information.

Indeed, just at the close of his labours the author has been introduced, through the kind attention of John Wilson, Esq., of Bloomsbury, to Daniel Benham, Esq.,* author of "A Sketch of the Life of J. A. Comenius," 1858, and obligingly recommended by him to consult Dr. Vaughan's "Protectorate of Oliver Cromwell," 2 vols. 8vo. 1838. The former work contains numerous references to Hartlib, who principally influenced the Commonwealth Parliament to invite Comenius to England; and whose measures for improving education he earnestly laboured to promote. In one of his manuscripts Comenius says of Hartlib,—"I don't know his equal in the extent of his knowledge." Dr. Vaughan gives the correspondence of the Rev. Dr. John Pell, who frequently alludes to Hartlib, and he is named by him to Sir Samuel Morland, and others; as also various letters from Hartlib, in which he repeatedly mentions his severe bodily sufferings, being "afflicted with three tormenting diseases," (5th May, 1658.) But the historian is wrong in attributing any inventions to him, for when he speaks of clepsydra, and other ingenious contrivances, he only records the productions as the works of others, and not his own. A careful perusal of this additional information has satisfied the author that no distinguishing trait of character has been overlooked in his own notice.

* See "Comenius' School of Infancy, with Sketch of his Life;" by Daniel Benham, post 8vo. 1858.

The bibliographer will feel especial interest in the long account given of Hartlib's numerous publications, which, however imperfect, is the most complete list that has yet been published.

Among the works mentioned will be found the one entitled "An Invention of Engines of Motion," reprinted at the end of the present work. Of this very scarce pamphlet there are two copies in the British Museum, and its present editor has presented his own copy to the Library of the Royal Society. Dr. Vaughan, in his "Protectorate of Oliver Cromwell," 1838, gives the Rev. Dr. John Pell's letter of 27th May, 1658, in which mention is made of Mr. Dymock; and in vol. 2, page 467, there is Mr. Dymock's report on the invention of an invalid's bed.

Whether for the man of letters or of science, the politician or the theologian, the historian or the biographer, the life of a man like Samuel Hartlib has many rare claims on human intelligence, sympathy, and respect. And whatever may be the failings of the present epitome of Hartlib's immeasurable labours and intellectual efforts, it is with some degree of confidence that the author appeals to the many important facts adduced as alone sufficiently affording abundant life-like characteristics of the subject of the present memoir.

H. D.

A

BIOGRAPHICAL MEMOIR,

ETC., ETC.

THE life of a truly good man, distinguished for untiring zeal in promoting public undertakings for the facilitating and extending of learning, as well as for increasing the industrial resources of his country, commands alike our respect and veneration. The incidents, however, of a long career of public and private usefulness are rarely calculated to surprise by stirring scenes of action, or to rivet attention by adventurous story, or a large admixture of lively with serious narrative. But as the character of the scholar and philanthropist possesses its own peculiar gentle attraction, we are led to seek the gratification of being informed respecting the private life, ordinary pursuits, and guiding principles actuating such men, however solitary and secluded may have been their customary habits and predilections.

Of the early personal history of Samuel Hartlib, we glean the most interesting portion from a short autobiographical sketch, written principally, no doubt, for the information of certain persons interested in pro-

moting measures to obtain for him that patronage and support, which, late in life, he was necessitated to solicit.

Among the eminent persons of his acquaintance was Dr. John Worthington,* Master of Jesus College, Cambridge, and Vice-Chancellor of the University. In a letter written to him on the 3rd of August, 1660, Hartlib† gives the following account of himself and family:—

"My father was a merchant, but no ordinary one, being the King of Poland his merchant; who hath founded a church at Pomania in Poland. And when the Jesuits prevailed in that kingdom, he was fain to remove himself into Prussia, where he came to Elbing, where not any house of credit was yet built. But he, with another, Patritius, of Breslaw, in Silesia, built two stately houses, which are yet standing at Elbing, being the principal houses of the town; the building whereof cost my father many thousands of rix-dollars in those cheap days. Immediately after he erected there Niumfirbing, my grandfather, the Deputy of the English Company at Dantzick, bringing the Company to Elbing; and so that town by trading came to that splendour and wealth wherein it hath continued these many years.

"My father had married before two Polonian gentle-

* The Diary and Correspondence of Dr. J. Worthington, edited by J. Crossley, Esq., Printed for the Chetham Society. Vol. 13, 4to, Manchester, 1847.

† Brit. Mus. Add. MSS. Ex. Legato Joh. Ward, No. 6269.

women, of a noble extraction, both of them being ladies, according to the fashions in those countries; in regard of which he obtained the sooner his third wife, my own mother. How many sums of gold, and erecting of pillars of honour, both to my grandfather and father, were offered both by Dantzick and Elbing, remains yet in the memory of some very old people in Prussia.

"My mother had two sisters, both which were very honourably married; one to a Lord Mayor's son at London, Mr. Clark; and afterwards to a very rich knight, Sir Richard Smith, one of the King's Privy Council; she bringing a portion to him of £10,000 sterling. This is my aunt, the Lady Smith, who marrying afterwards to Sir Edward Savage, was made one of the Ladies of Honour to our King's mother. The other sister was married to a younger brother, Mr. Peak; whose son hath now an estate of £300 sterling of land of inheritance yearly; and who is still alive. Our cousin-german, or my aunts', the lady Smith's daughter, was married to Sir Anthony Irby, at Boston, a knight of £4,000 or £5,000 sterling a year; who is still alive, and a Parliament Man.

"But before all this I should have told you, that I have been upbraided for my too much negligence of my pedigree: whereas they told me that my family was of a very ancient extraction in the German Empire; there having been ten brethren of the name of Hartlib. Some of them have been Privy Counsellers to the Emperor, some to other inferior Princes; some Syndicks of Aus-

purg and Norimberg. But they passed afterwards not so strictly for Vedallanta in the Empire, when some turned merchants; which, you know, is derogatory to the German nobility.

"I may speak it with a safe conscience, that I never, all the days of my life, reflected seriously upon my pedigree; preferring my heavenly birth above all such vanities, and afterwards studying more to this very day, to be useful to God's creatures, and serviceable to his church, than to be rich or honourable.

"Let it not seem a paradox unto you, if I tell you, as long as I have lived in England, by wonderful providences, I have spent yearly out of my own betwixt £3 or £400 sterling a year. And when I was brought to public allowances, I have had from the Parliaments and Councils of State a pension of £300 sterling a year, which as freely I have spent for their service and the good of many.

"I could fill whole sheets in what love and reputation I have lived these thirty years* in England; being familiarly acquainted with the best of Archbishops, Bishops, Earls, Viscounts, Barons, Knights, Esquires, Gentlemen, Ministers, Professors of both Universities, Merchants, and all sorts of learned, or in any kind useful men, &c. And that in all the three kingdoms, under all

* Thus dating from 1630, but in his publication, "*A Short Letter*," *&c.*, 1644, he mentions his acquaintance with Mr. Woodward in 1628.

the changes that have fallen out, [I have been] recommended before and in Parliaments; books dedicated unto me from several places and countries, &c. But I grow weary to pursue such vanities."

It was at a period when the Jesuits prevailed in Poland that Hartlib was obliged to take refuge in Prussia; and, as appears from his own statement, he came over thence into England about or before 1628. We find him in 1633, associated with John Durie, promoting a theological publication, perhaps his earliest connection with the press in this country. Among the State Papers of Charles the First's reign,* is a MS. of one page, dated Heilbron, April $\frac{3}{13}$, 1633, from Durie to Sir Thomas Roe, requesting him, among other matters, to assist Mr. Hartlib with a Petition of Divines of those quarters, concerning an edition of a Body of Practical Divinity, gathered out of English authors, a work which will be exceedingly profitable, but will require divers agents, and an exact ordering of the work, for which he considers no one fitter than Sir Thomas himself.

Eleven days later, he sent Sir Thomas, by Mr. Hartlib, whose industry he specially recommends, certain political propositions and articles. And a fortnight later, from Frankfort, requests Sir Thomas

* Cal. of State Papers, D Series, J. Bruce, F.S.A., 1633—1634, 8vo, 1863.

to show his letter to him, to Mr. Hartlib; and on the 23 May, solicits the same favour in respect of other correspondence.

On the margin of one of these documents, dated July 20, 1633, occurs the notification of "Mr. Hartlib, a Prussian."

In 1634—5, John Durie continued writing to Sir Thomas Roe in the same strain of confidential intimacy with Mr. Hartlib, who, he says, would send anything to him, which Sir Thomas desired to have communicated in a secret way.*

The transactions of the following ten years of his life can only be surmised from his letters, and publications of 1639, 1641, and 1642; carrying out an extensive plan of public agency, with the view of promoting the general good of mankind in the most liberal and unprejudiced manner possible.

Milton, in the year 1644, addressed his essay "Of Education," a closely printed quarto tract of eight pages, "To Master Samuel Hartlib," to whom he writes in the following encomiastic strain:—

"I am long since persuaded, that to say, or to do aught worth memory and imitation, no purpose or respect should sooner move us, than simply the love of God, and of mankind. Nevertheless, to write now the reforming of Education, though it be one of the greatest

* Ibid, 1634—1635, 8vo, 1864.

and noblest designs that can be thought on, and for the want whereof this nation perishes, *I had not yet at this time been induced, but at your earnest entreaties and serious conjurements;* as having my mind for the present half diverted in the pursuance of some other assertions, the knowledge and the use of which, cannot but be a great furtherance both to the enlargement of truth and honest living, with much more peace. Nor should the laws of any private friendship have prevailed with me to divide thus, or transpose my former thoughts, but that I see those aims, those actions which have won you with me the esteem of a person sent hither by some good providence from a far country, to be the occasion and incitement of great good to this island. And as I hear, you have obtained the same repute with men of most approved wisdom, and some of highest authority among us. Not to mention the learned correspondence which you hold in foreign parts, and the extraordinary pains and diligence which you have used in this matter, both here, and beyond the seas; either by the definite will of God so ruling, or the peculiar sway of nature, which also is God's working. Neither can I think that so reputed, and so valued as you are, you would to the forfeit of your own discerning ability, impose upon me an unfit and over ponderous argument; but that the satisfaction which you profess to have received from those incidental discourses which we

have wandered into, hath pressed and almost constrained you into a persuasion, that what you require from me in this point, I neither ought, nor can in conscience defer beyond this time, both of so much need at once, and so much opportunity to try what God hath determined. I will not resist, therefore, whatever it is either of divine or human obligation that you lay upon me; but will forthwith set down in writing, as you request me, that voluntary idea which hath long, in silence, presented itself to me, of a better education, in extent and comprehension far more large, and yet of time far shorter, and of attainment far more certain, than hath been yet in practice."

Cromwell's secretary was not likely to employ court flattery, what he said came pure from his heart; and they were no idle or inconsiderate words, when he expressed his estimation of Hartlib, as to his being "a person sent hither by some good providence from a far country, to be the occasion and incitement of great good to this island." Nor was he mistaken in the opinion thus deliberately and prominently expressed. Although Hartlib could only then have been 16 years in this country, yet his popularity was such that our great poet lauds him as one in "repute with men of most approved wisdom," and as being worthily engaged in "learned correspondence." The fact of Milton's having written his treatise "Of Education," principally at the urgent solicitation of Hartlib, offers a

favourable illustration of the course adopted by him to procure the best possible information on important topics, for public benefit. His zeal was not a feeble and dubious blaze of light, but the heat and fervour of unsophisticated, unquenchable enthusiasm of the rarest and most refined quality.

In 1644, Samuel Hartlib, was a witness against Laud, as stated in the History of the troubles and trial of Will. Laud.* He was also the same year, jointly with Philip Nye and Thomas Goodwin, concerned in writing An Epistolary Discourse about Toleration.†

Samuel Hartlib's publications amount to two duodecimos, two octavos, and about twenty-eight quarto treatises of various bulk and character, but mostly they are short pamphlets or mere tracts. Many of them have become very scarce, and all possess interest for the historian and bibliographer.

Of his early friend and associate in several literary matters, John Durie, a Scotchman, who was at Oxford in 1624, Ant. à Wood ‡ says :—

"For more in relation to the transactions of his life see a letter written by him to his ancient acquaintance Sam. Hartlib, Esq., who published it (when Durie fell into the displeasure of the presbyterians for showing himself false to them in several respects) with the

* From a note in Ashmole, by Ant. à Wood.

† Wood's Ath. Ox. 3rd edition, 4to, 1815, Vol. III., p. 965.

‡ Fas. Ox., 3rd edition, Vol. I. 4to, 1815.

title—"The Unchanged, Constant, and Single-hearted Peacemaker drawn forth into the World; or, a Vindication of Mr. Joh. Dury from the Aspersions cast upon him in a nameless Pamphlet, called 'The Time-serving Proteus, and ambidexter Divine, uncased to the world; wherein, &c.,'" in 3 sheets, 4to, 1650.

He wrote among other works:—

"Seasonable Discourse for Reformation." 4to. 1649. Published by Sam. Hartlib.

"The Reformed School." 12mo. 1650. Published by S. Hartlib. And

"Supplement to the Reformed School." 12mo. Published by Sam. Hartlib.

One of Hartlib's early publications had reference to ecclesiastical matters, to which, as we learn from his *Reformed Spiritual Husbandman*, he had ever a stronger leaning than to other subjects.

But industrial arts likewise claimed a considerable share of his attention, as accessories in promoting civilization and the general welfare of society. His several publications in relation to Husbandry, a subject in which he took a lively interest, obtaining for him the favourable opinion of Cromwell, a pension of £100 a year was awarded to him, in 1646, as evidenced by the following report of proceedings in Parliament.*

"25th June, 1646.—Mr. Solicitor, Sir William Walter,

* Jo. H. Com. 1644-1646, Ch. I. Vol. IV. folio, pp. 587, 588.

Mr. Holland, Sir Arthur Hesilrige, Mr. Wallopp, Mr. Prideau, Dr. Dennis Bond, Sir John D'Avres.

"This Committee, or any four of them, are to consider of some present maintenance for Mr. Hartlib, who hath done very good service to the Parliament; and also of some place at Oxford for him, for his future support.

"*Resolved, &c.*—That the sum of One Hundred Pounds be forthwith advanced, and paid by the Committee at Goldsmith's Hall, unto Mr. Hartlib, without account, for his present maintenance and subsistance.

"*Resolved, &c.*—That the sum of One Hundred Pounds be forthwith advanced, and paid, by the Committee of Lords and Commons sitting at Haberdasher's Hall, for advance of monies unto Mr. Hartlib, without account, out of the first monies that shall come into the said Committee.

"The Lords' concurrence to be desired herein."

And the year following his allowance was trebled, when an attempt was again made to obtain for him some suitable position in Oxford. The Report of the Parliamentary proceedings* states:—

"31st March, 1647.—*Ordered.*—That the Committee for Advance of Monies, at Haberdasher's Hall, do forthwith pay unto Mr. Hartlib the sum of Three Hundred Pounds, in consideration of his good deserts,

* Jo. H. of Com. Vol. V. folio, pp. 131, 132, 133.

and great services to the Parliament: And the Lords and Commons, considering the present great necessities of the said Mr. Hartlib, and his family, do hereby earnestly recommend it to the said Committee, That speedy payment may be made of the said Three Hundred Pounds. And the more particular care of this business is especially referred to Mr. Lisle and Mr. Bond.

Ordered.—That it be referred to the Committee for the University of Oxon, to take into their especial consideration the deserts of Mr. Hartlib, both from this Parliament, and from all that are well-wishers to the advancement of learning: and to recommend him to some place of benefit in the University of Oxon; where he may have an encouragement, and future supply.

"2nd April, 1647.—Sir John Clotworthy carried to the Lords the vote for
Three hundred pounds, out of Haberdasher's Hall, for Mr. Hartlib.

"And brings Answer,
That, to the Order for Three hundred pounds to Mr. Hartlib, out of the Haberdasher's Hall, they do agree."

On the 27th of November, 1655, Evelyn notes in his Diary* that he went "to visit honest and learned Mr. Hartlib, a public spirited and ingenious person,

* Diary and Correspondence of John Evelyn, F.R.S., Edited by W. Bray, Esq., F.A.S. 4 vols, post 8vo. 1852. Vol. I. p. 310.

who had promulgated many useful things and arts." He further mentions as a subject of conversation that: "He told me of the castles which they set for ornament on their stoves in Germany (he himself being a Lithuanian, as I remember), which are furnished with small ordnance of silver in the battlements, out of which they discharge excellent perfumes about the rooms, charging them with a little powder to set them on fire, and disperse the smoke; and in truth no more than need; for their stoves are sufficiently nasty. He told me of an ink that would give a dozen copies, moist sheets of paper being pressed upon it, and remain perfect; and a receipt how to take off any print without the least injury to the original. This gentleman was master of innumerable curiosities, and very communicative."

This shortly noticed interview is very characteristic of Hartlib, for here, as in his correspondence, he is ever giving information in respect to some novelty or other of the day suitable to the taste of his visitor or correspondent.

Evelyn had engaged to write a *History of Trades*, in which he made slow progress, declaring to the Honourable Robert Boyle, August 9, 1659, his finding among other obstacles, as he says:—"I cannot support, of conversing with mechanical capricious persons, and [I meet with] several other discouragements." He also remarks, that he has prepared the heads of such a work, "a speci-

men whereof I have transmitted to Mr. Hartlib, concerning the ornaments of gardens, which I have requested him to communicate to you." It was thus that Mr. Hartlib rendered himself serviceable to persons in every sphere, and was in the confidence of men of very different views in their religious and political sentiments.

In his letters to the Honourable Robert Boyle, commencing 13th of May, 1658, he alludes to his "very great straits, to say nothing of the continual (almost daily) disbursements for others."

His correspondence, as we learn indeed from his own narrative, was very extensive among the great and learned men of all classes at home and abroad; as well as with others in a humble sphere of life, if distinguished for more than ordinary talents. Much of this voluminous correspondence has been fortunately preserved, while only too large a portion has suffered the common fate incident to a disturbed state of society, combined with the ordinary mutability and accidents of time. His letters show that he lived respectively near Angel Court, Charing Cross, some while at Duke's Place, and later at Axe Yard. He does not appear to have had any immediate business, or professional or public engagements; but seems to have wholly devoted his time to making himself acquainted with the literary, scientific, theological, and political information of his day; by which means he became the centre, as it were, of a large and mixed society, for whom he fulfilled

duties approaching, in many respects, that of a general agent or secretary. He was in himself a kind of imaginary institution, of which he represented the proprietors, council, and all the officers; the funds too, being wholly his own. And that this idea is not far from the truth, if not the very governing principle of his conduct, we shall see hereafter. He desired to be all things to all good and needy men; and to draw the public to engage in like labours of love, tending to the increase and spreading abroad of intelligence, improvement, and industry.

For properly estimating the character and labours of Samuel Hartlib, we must bear in mind the state of society from 1630 to 1660, which comprises the period of his principal, if not of all his publications. The means then at command for obtaining publicity for any book, commodity, or important matter whatever, was comparatively meagre. Without the patronage of the great, authors and traders alike were at the mercy of a capricious public. Popular literature was indeed in its veriest infancy. It was, therefore, a public boon to have a friend always at hand like Samuel Hartlib, who, appreciating merit, was foremost to promote it by publishing a pamphlet, with his own commendatory dedication, or address, or otherwise; and not only so, but by afterwards circulating such information among the great and learned of every grade, whether in England or on the Continent. In the course of years

it became obvious that no trickery was contemplated, and that if the projects recommended to public patronage appeared open to some objections among fastidious persons, at all events the author, or agent, promulgated his views in perfect sincerity.

In all these literary labours, Hartlib's publications plainly show that he was rather the caterer for the advantage of the public, than the scholar himself producing the needful works of useful knowledge. The prefatory matter of his several publications, pretty well explains his motives of action.

It must be admitted that few of these works would interest the modern reader; those on Husbandry, Bees, and Silkworms having long since been superseded; but the case was quite different in the middle of the seventeenth century, and we are not to despise the scaffolding by means of which the superstructure of modern sciences and improvements has been raised to its present magnitude.

From a bibliographical sketch of publications bearing Samuel Hartlib's name, appended to the present memoir, the reader will be enabled to form an opinion of their nature and character. Of these, "*An Invention of Engines of Motion*," has been reprinted in extenso in the present volume, and will serve as a singular example of the humble state of mechanical information in 1652.

In 1641, Hartlib had published "*A Description of the famous Kingdom of Macaria*," on the models of the

Utopia of Sir Thomas More, and the Atlantis of Lord Bacon. Alluding to this fiction in a letter addressed to Dr. Worthington, dated Jan. 30, 1659, he casually observes:—"I hope that MACARIA will have a more visible form before" certain political matters named, "and then he shall need none other additional patronage."

This remark has reference to a proposed institution, on which Mr. Crossley notes: "Macaria (from μακαριος, blessed or happy) was the name of an intended society, the establishment of which, Hartlib appears to have been confidently expecting at this period. It was to unite the great, the wealthy, the religious, and the philosophical, and to form a common centre for assisting and promoting all undertakings in the support of which mankind was interested." He earnestly endeavoured to organise the proposed project, and truly "he lived in the magnificent scheme which his ardent philanthropy had planned."

Writing to the Honourable Robert Boyle he incidentally remarks on the same subject:—"The truth is, I design all such and the like works or tracts (named in his letter) to be printed upon the charges of Macaria, whose scope it is most professedly to propagate religion and to endeavour the reformation of the whole world. But it is scarce one day (or one hour in the day,) or night, being brim full with all manner of objects of that most public and universal nature, but my soul is crying out:—

'Phosphore redde diem quid gaudia nostra moraris,
Phosphore redde diem!'"

In editing Dr. Worthington's Diary, Mr. Crossley is led to observe respecting Hartlib, (who in a letter dated July 20, 1659, refers to some printed discourse which he designates "very lovely and desirable,") that it was "doubtless, one which Hartlib had very much at heart, some proposal or model for the establishment of a philosophical college; for at the time, projects of this kind were very generally entertained." Evelyn suggested forming a private society of this sort, a desideratum to which constant reference is made throughout Hartlib's correspondence.*

Hartlib projected likewise the plan of a Philosophical College to be designated ANTLANTIS, of which he gives an account in—"A Memorial for Advancement of Universal Learning." For this object it was made public that "Mr. John Dury, library keeper of St. James's, and Samuel Hartlib, Esq., have accepted the trust of receiving and disposing such sums of money, as well affected persons and lovers of the public good shall be pleased to give." This seems to have had attached to it the names of subscribers approving "these pious and noble aims." But

* Forty years later appeared "Proposals for raising a Colledge of Industry of all useful Trades and Husbandry, with profit for the rich, and a plentiful living for the Poor." By John Bellers. Pp. 28. 4to. 1696.

nothing came of the proposal, which probably did not meet with sufficient support to carry out so large a design.*

His correspondence with Mr. Boyle, so far as we learn from published letters, between November 16th, 1647, and April 19th, 1659 (a period of 12 years), comprises a large miscellany about personal matters, and eminent men engaged in different pursuits, mingled with observations on topics which could only interest Hartlib from their gratifying Boyle. Take, for example, such subjects as pneumatic experiments, medical matters, chemical discoveries, insects, malt-drying, colours, Becker's and also Kuffler's Inventions, &c.

But while launching out into these particulars, which may be considered quite extraneous, his heart was set on religion, learning, and the public weal. In 1647, he wrote to Mr. Boyle concerning:—"The office of communications (which he says) is to follow very shortly, God willing, especially in reference to universal learning." And pleasantly concludes:—"I am more than resolved to continue in this kind of folly to serve the good of many."

He was at that time endeavouring to have Mr. Petty,†

* See Add. MSS. Brit. Mus. Ex. Leg. J. Ward, No. 6271.

† Afterwards Dr. Petty, and later Sir William Petty. See Hartlib's publication of his letter—W. P. in the list of his pamphlets.

then 24 years of age, promoted to a situation, either connected with the proposed "Office of Communications," or elsewhere. It would appear that an attempt had been made to establish such an Institution at Vauxhall, but the property there was pre-engaged. On the 24th of July 1649, therefore he writes to inform Mr. Boyle:— "As for Vauxhall, there is a proviso put into the Act, that it shall not be sold. My endeavours are now, how Mr. Petty may be set apart or encouraged for the advancement of experimental and mechanical knowledge in Gresham College at London, of which you shall have true account also."

Some writers have expressed surprise that Doctor Sprat does not name Hartlib in connection with the establishing of the Royal Society, founded in 1660. It is very doubtful, however, whether he was ever connected with it, or was even remotely concerned in suggesting its early meetings, being nothing of an experimentalist, and a very unlikely person to have any original views on the subjects discussed even at the earliest meetings of the society. His correspondence with its several members does not confirm the supposition that it was organised on any plan of his suggesting; and, assuming the contrary, his own silence on the subject is the more remarkable, for success was not the crowning feature of the many benevolent schemes he suggested, although on the other hand, much is due to his untiring energy in keeping alive the designs he had in view, and inciting

in others the same ambition to carry them into effect under more favourable circumstances, even after his own career of usefulness should be brought to a close. He was content to be the sower, confidently believing that all would not fall on stony ground.

We are too apt to imagine, when we do not perceive immediate and brilliant results following any new course of action, that nothing has been effected, and to condemn the whole business as a failure. But in Hartlib's case we must not lose sight of the fact that he stood almost alone in his attempts to ameliorate the condition of society. In his latter years he lived in a metropolis where the Court set the worst possible example in morals. His religious views were, therefore, countenanced by comparatively few, and yet religion was his chief aim. He endeavoured during the Commonwealth to introduce improved systems in scholastic education, but although aided by the powerful assistance of the master-mind of Milton, he failed to establish a new system of schools or of Colleges. In Husbandry he succeeded better, and patronised by the Protector, he at least earned a livelihood and obtained means to enlarge his bountiful designs. But after all, even in this department of acknowledged utility, he never received any accession of strength; all that was effected being due to his own humble yet energetic efforts. The government and the public were alike apathetic to his schemes for benefiting

mankind, and he could only have been sustained throughout so long a period of his life by the sincerity, earnestness, and thorough purity of his zeal, in the prosecution of so many and such, multitudinous attempts to better the moral and intellectual condition of society at large.

Samuel Hartlib had to pay the penalty of the fame he acquired through his numerous publications and his various projects and undertakings, by being made the subject of satire. A pamphlet came out in 1660, under the title of—

"OLBIA:* The new Island lately discovered; with its Religion and Rites of Worship; Laws, Customs, and Government; Characters and Language; with Education of their Children in their Sciences, Arts, and Manufactures; with other things remarkable.

"By a Christian Pilgrim, driven by Tempest from Civita Vecchia, or some other parts about Rome; through the Straits, into the Atlantick Ocean. The first part. From the original. For Samuel Hartlib, in Ax-Yard, Westminster, and John Bartlet, of the Guilt-Cup near Austin's-Gate, London; and in Westminster Hall." 4to, 380 pages. The second part was never published.

In a letter dated Dec. 17, 1660, which Hartlib wrote to

* In Lowndes's Bibliographer's Manual, and also in the last edition of the same, *Olbia* is mistakenly named as one of Hartlib's own publications.

Dr. Worthington, he enquires:—"But have you seen a certain anonymous book in 4to called *Olbia?* I confess I was not well pleased, seeing the book directed to my name as it is. They say it reflects upon me as if I were a refined Quaker, or a fanatick; insomuch that I was almost resolved to give public notice of my dissatisfaction, nor could I guess at the author of the said book." He however, suspected John Sadler to be the party concerned, of whom see a notice by Mr. Crossley, Camden Society's Publications, 4to, Vol. XIII. p. 252.

Dr. Worthington, in a letter of the 11th of March, 1660, says:—"I thank you for Olbia, which as yet I have not time to read through." On the first of April, 1661, he enquires:—"Is the second part of Olbia like to come out shortly?" And observes:—"The design promises much variety." Hartlib replied the next day:—"I hear nothing yet of Olbia's second part. I sent also a copy to Mr. Beal, of the first part, who answers:—'I dare not pass a hasty judgment upon such a mass of weighty particulars, but I do in Olbia find many such profound rests for my spirit, as I never could obtain by other readings or studies.'" Mr. Beal proceeds in the same spirit of kindly recommendation of this rhapsodical production. Dr. Worthington. writing again on the 19th of April, enquires whether Mr. Beal has read "Dr. More's late Book of Christian Religion," probably from supposing the author's seraphic mysteries would suit his taste for the enigmatical.

On the 17th of Dec. 1660, Hartlib had expressed his own opinion of Olbia very plainly, confessing his chagrin on seeing it. And well he might on reading such a farrago of learned nonsense. But the first perusal of it seems actually to have perplexed Dr. Worthington as well as Mr. Beal, the former speaking but hesitatingly and doubtingly about this spasmodically written performance. It consists of 15 leaves without paging, printed in large type, in double columns, except a poetical rhapsody at the end, on two pages and a half. It is a wild burlesque, which reads like heads for a strange cabalistic but extremely incoherent discourse. The last paragraph runs:— "Some of the Hymns, that could be taken, but abrupt, and lost by translation, seemed thus:—

'Divine Sophia! though I sprawl in clay;
Yet thou art neer ally'd: and for a day
Of wo, made of Woman.

* * * * *

'Tis little love, to love our like, or friend;
And less, to love our lovely; Fair and Pride;
All sinners may do this, and hypocrites.'"

Mr. Beal's serious treatment of such a production reminds one of an instance of similar credence given to Gulliver's Travels. The very title-page of Olbia is sufficient to stamp it as a mere satire; Wodenothe, one of Hartlib's publishers, had for his sign the "Golden

Heart," which is quizzed by the imaginary sign of the "Guilt-Cup," perhaps punning on "Gilt-Cup."

Writing about his books, in a letter to Dr. Worthington, 22nd Nov. 1661, he says:—"If Petrœus call upon me (or upon any other occasions) I shall not fail, God willing, to enquire whether Josephus be in the press or at Leyden. It is likely they are acquainted with Cocceius, Nisselius, and Elzevir; but to look into my catalogue of books printed in Holland is no more in my power, the wretched man (where all my books stood) having suffered (with a world of other MSS.) distraction [destruction?] or embezzlement, so that I cannot as yet tell what is remaining or not, the catalogues themselves being lost or made away."

On this event Mr. Crossley, as editor of Dr. Worthington's Diary, remarks:—

"Hartlib was particularly unfortunate in this respect. A fire afterwards occurred, as he mentions in a subsequent letter, from which his papers and MSS. received great damage. Had the whole of his MS. collection and Correspondence been preserved entire, they would have formed an admirable foundation for the Literary and Philosophical History of England in the middle of the seventeenth century."

In the Addenda to Pepys's Diary (Vol. V., p. 221,) the noble editor states that:—"Nan Hartlib was sister to Samuel Hartlib."

Pepys mentions this lady in his Diary on the 10th

of July, 1660, remarking:—"This day I put on my new silk suit, the first that ever I wore in my life. Home, and called my wife, and took her to Clodius's to a great wedding of Nan Hartlib to Mynheer Roder, which was kept at Goring House with very great state, cost, and noble company. But among all the beauties there, my wife was thought the greatest."

Pepys's next visit to Goring House, was six years later, when it became the residence of Lord Arlington. He observes that it was the house "where I was once at Hartlib's sister's wedding."—Vol. III. p. 235.

About the middle of the year 1658, Hartlib was a complete martyr to disease and the further punishment of quacks: for the knowledge of medicine was then at a low ebb, and the strongest and most violent remedies were recommended for the alleviation of the ills of suffering humanity. His letters to Boyle are full of expressions such as an afflicted Christian could alone indite or dictate. On the 25th of April 1658, he writes:—"I may truly say, even in an outward sense, 'I die daily.' These three days I have been near unto death." On the 26th of May he recovers a little:—"since my last the fury of my pains have very much abated." But on the 8th of June comes:—"my body is still full of pains, though not so violent."

His immediate necessities, it would appear, obliged him to make appeals to his friends for present support, pending the non-payment of his pension.

In the Diary and Correspondence of Dr. Worthington we find the following entry:—

"Given to Mr. Hartlib anno 1659, by

Dr. Whichcote	2	0	0	Mr. More . .	1	0	0
Dr. Wilkins .	1	10	0	Mr. S. Cradock	1	0	0
Dr. Cudworth	1	0	0	Mr. Marsh, &c.	2	0	0
Dr. Worthington	1	10	0				
				10 lib.	0	0	

Given by me 1660, 1 lib. 0 0."

And on the 11th of Jan. 1661, Hartlib writes:—"I was surprised on Saturday last, with a gift of 6*l.* procured by Mr. Patrick, of Battersea, which the good man Dr. Whichcote was pleased to deliver unto me."

The following unaddressed letter, from an unpublished MS. in the author's possession, is here given as affording a fair example of the interest always evinced by the writer in the several matters that engaged the attention of his correspondents; and of his desire and efforts to give publicity to all new or worthy designs. The letter derives a further interest from its having an excellent autograph attached.

"Much honoured Sir,

"I had a letter of June 15, from our worthy friend in these words:—'Your last was short but sweet, and very much obliging, bringing me the comfort of Mr. Evelyn's hearty endeavours to recover me for the Hospital, of which I have lately given acknowledgments in some that I now fear are miscarried; for you make

no mention of them in these or the former. They contained 2 Sheets of Colours, with relations to Mr. Worsley. As bad as they were, I shall be loath to lose them. I must now be the more earnestly troublesome to my friends for the Hospital be[cause] I hear that other eyes are upon it, and some competitors. If the grant should be from the Parl[iament] or from the Great Seal I think there should be also a Warrant or Order to the High Sheriffe to give possession. If it must pass by the Great Seal; or that, otherwise, ready money must be provided, I shall appoint it to be in readiness in the hands of my sister Beale or of Mr. Richard Shermyne.'

"You will excuse this freedom on the behalf of so worthy a friend. Nor had I sent perhaps these lines but that I read in a printed pamphlet, come forth yesterday, called—'An Exact account, Wednesday 20 June. The House approved of Dr. Nicholas to be Governor of St. Nicholas Hospital in Bristol;' for it may be you have not heard of this passage, by which it seems it would be seasonable to move also for Mr. Beale's desired Hospital. Here you have the copy of Mr. Worsley's letter of Colours, which was sent to Mr. Beale, and which he answered in 2 Sheets. It is not yet even to my hands, which I confess doth discompose me not a little. But if I yet receive it, I suppose I shall not forget to impart it as readily as I do now that of Mr. Worsley's.

"I hope also I shall be able to give you a further account of the secret Society (so much desired after), a prime Member that hath been with his Maj[esty] being yesterday safely arrived. For I am upon all occasions assuredly,

Much honoured Sir,
Yours truly respect[ful],
And most faithful Servant,

Axe-Yard, June 23, 1660." S. Hartlib.

Keen necessity obliged him in his uttermost extremity, afflicted by severe sickness, oppressed by many debts, and advanced in age, to petition Parliament the first year of the Restoration. It would appear as though he had written to the nobility and others to seek their patronage in the effort he was making, and among others to Henry, Lord Herbert, son of the great Marquis of Worcester, author of that curious production "The Century of Inventions." His letter is dated 22nd of November, 1660*, and runs thus :—

* Dr. White Kennet's Register and Chronicle Ecclesiastical and Civil: containing matters of fact, delivered in the words of the most authentick books, papers, and records; digested in exact order of time. Faithfully taken from the MS. collections of the Lord Bishop of Chester. 2 vols, folio. 1728. Vol. I. p. 871.

"My most honoured Lord,

I have been very ill of late, and by manifold miseries so far oppressed, that I could not send this week my wonted paper respects. Lord Annesley was pleased some months ago to honour me with a visit, having an intimation of my forsaken condition. He was pleased to tell me, I sinned, if I did not make my condition known. I confess this is a very hard duty to be performed, which also I have deferred to this day. But necessity being so urgent *(& literæ non erubescunt.)* I beseech your honour give me leave to intimate very briefly my present most distressed and forsaken condition. I suppose your honour is not ignorant of the votes that have passed concerning gifts, pensions, debts, allowed or contracted by the former powers, that all of them are made void by this Parliament. Also that no motion is to be made concerning money-matters 'till the debts of the army and navy be first satisfied. Both these votes fall most heavily upon your Honour's tormented servant: so that he hath nothing to expect of all his arrears which (amounting to seven hundred pounds), would have fully freed him from all his debts, and given him a present comfortable subsistence, nor of his yearly pension settled upon him by the first parliament consisting of Lords and Commons. I have nothing therefore left to keep me alive, with two relations more, a daughter and a nephew, who is attending my sick condition. You see, most honoured

Lord, how I am necessitated to make my humble and hopeful application to your so often experimented kindness, that your honour would not leave nor forsake me at this time, but rather enlarge the bowels of your love by joining with some other honourable worthies (I mean chiefly the Right Honourable Earl of Manchester, and the forenamed, Lord Annesley) to make up such an assistance, as may save your and their most devoted servant from utter perishing, 'till some other means of public love and encouragement may be (if it may be) determined. I durst not have expressed myself so boldly, but that I know your honour hath been always a person of solid honour and faithfulness unto me, and that I really believe, that when the time of refreshing shall come, such deeds of compassion will certainly be honoured and rewarded with exceeding joy."

The letter affords much interesting information. We find that the Parliament of the Commonwealth had suffered Hartlib's pension to remain unpaid for two or more years; and it is not probable that under the new order of things he would have any chance of recovering his claim. Indeed he must have keenly felt, that notwithstanding his unblemished character, the violence of political partizans was such, as to promise him small hope of success in the principal object of his petition. It is a lamentable plaint of his, "my present most distressed and forsaken condition."

He was, we find, a widower, then having charge of the support of two relatives, one daughter and a nephew. He who had been a father to the fatherless, and the warm hearted friend of hundreds in their keen necessities, entreats one who is almost a stranger, yet who has often relieved him formerly, to "enlarge the bowels of his love" towards him.

It was probably not long after this occurrence that the following petition was submitted by him:—

> "*To the Right Honourable the Commons of England assembled in Parliament. The humble Petition of Samuel Hartlib, Sen.**
>
> "SHEWETH—
>
> "That your Petitioner, ever since he came into this kingdom, hath set himself apart to serve his generation in the best objects :—
>
> "*First,* by erecting a little academie for the education of the gentrie of this nation, to advance pietie, learning, moralitie, and other exercises of industrie, not usual then in common schools.
>
> "*Secondly,* by giving entertainment, and becoming a solicitor for the godly ministers and scholars, who were driven in those days out of the Palatinate, and other Protestant Churches then laid waste. By which means,—

---

* Brit. Mus. Add. MSS. Nos. 6269 and 6271. Also Kennet's Regis. and Chron. Folio, 1728, p. 872.

"In the *third* place, your Petitioner found an opportunitie to maintaine a religious, learned, and charitable correspondence with the chief of note in forraine parts; which, for the space of thirty years and upwards, he hath managed for the good of this nation, as well in civill as ecclesiastical concernments (as is well known to most of the leading men of all parties), by procuring unto them,—

"1. Rare collections of manuscripts in all the parts of learning; which your Petitioner freely hath imparted, transcribed, printed, and sent to such as were most capable of making use of them.

"2. The best experiments of industrie practised in husbandrie and manufactures; tending to the good of this nation; which, by printing, he hath published for the benefit of this age, and of posterity.

"3. A constant relief, according to his ability or address, for poore distressed schollars, both of this nation and of forreignors, who wanted employment; to recommend them to such as could make use of their service.

"4. A constant intelligence in matters of pietie, virtue, and learning, both at home and abroad, with those that were best able to concur therein, for the good of mankind in all respects.

"Now, your Petitioner having continued in this course of life for the space of thirty years and upwards (without partiality, serving all publick and ingenious spirits indifferently), and in these great and strange

revolutions being destitute of support to continue this kinde of negotiation; and in his old and sickly age to maintaine himself and his family; for the relief of which, and his agency, he hath been forced to contract debts, which in the end will sinke him, except some favourable aspect be shewed unto your Petitioner from your Honours, as the patrons of pietie and learning.

> "May it, therefore, please your Honours, in consideration of the premises, to take your humble Petitioner into your favourable consideration, that he may finde from your goodness and bountie some relief in this his distressed condition, by being freed from his debts, and put in a capacitie to continue his service to the publick, to advance in his generation the best objects for the use of mankind in all kinds.
>
> "And your Petitioner, &c."

It has never transpired what came of this application. But it is sufficient to know that money was scarce, being wanted for the army, the navy, the government, and not least for a luxurious Monarch's unbridled pleasures, and there is not much reason to believe that he who had dedicated his works to Cromwell and the Parliament, and for some twelve years or more enjoyed a pension in acknowledgment of his public services, was likely to obtain a favourable

hearing, in preference to more assured friends of the new government, who were seeking some amelioration of as many or more years of acute suffering. Hartlib's claim, as compared to that of hundreds of returned exiles, must have appeared trifling indeed to cool calculating politicians, disposed to no conciliatory view of the events and supporters of the Commonwealth.

Hartlib's simple and confiding nature is but too well illustrated by the unfortunate result of his improvident liberality. The Commonwealth having allowed his salary to fall into arrear, it was not until after two years' income remained due to him, that he became fully alive to his precarious situation. At the close of 1659, public subscriptions were raised for his support, which had to be repeated in 1660, by which time his circumstances had become so desperate that he left no means untried to obtain some small relief from old familiar correspondents and from persons of quality with whom his connection was but slender. Nothing can be more lamentable than the necessitous condition of one who has manfully played the part of a public servant for a long series of years by acknowledged beneficent actions. At the same time we are naturally perplexed to understand how a man of such acute observation, enlarged experience, and not wholly unpossessed of business habits, should have been so short-sighted as to make no provision whatever for the future, and to expend his entire means in public services, without

any assurance that, when the day should come in which man cannot work, he would have the means of common livelihood. Self-protection is so implanted in our nature, that, however we may admire the sacrifice, we cannot but deplore the result in the case of this martyr to humanity; who finding friends and bread for many, came at last to the sad necessity of himself soliciting the cold hand of charity.

Samuel Pepys notes in his Diary* of the 7th of August, 1660:—"While I was at dinner in came Samuel Hartlib and his brother-in-law, now knighted by the King, to request my promise of a ship for them to Holland, which I had promised to get for them." Later the same day he remarks:—"At night, meeting Samuel Hartlib, he took me by coach to Kensington, to my Lord of Holland's; I staid in the coach while he went about his business."

That Hartlib did not accompany his brother-in-law to Holland, we may infer from the next entry in the same Diary on the 23rd of February, 1660-61. "This my birthday, 28 years. Mr. Hartlib told me how my Lord Chancellor had lately got the Duke of York and Duchesse, and her woman, my Lord Ossory, and a Doctor, to make oath before most of the Judges of the

* Diary and Correspondence of Samuel Pepys, F.R.S. With a Life and Notes by Richard Lord Braybrooke. 3rd edition. 5 vols. post 8vo. 1848. Vol. I. p. 126.

kingdom, concerning all the circumstances of their marriage."

William Wotton, wrote to Evelyn from Milton, on the 13th of August, 1703, making inquiry among other matters for—"An account of Mr. Hartlib: what countryman? What his employment? in short, a short eulogy of him, and his writings and designs, with an account of the time of his death."

On the 12th of September, 1703, Evelyn replied:—"Mr. Hartlib was, I think, a Lithuanian, who coming for refuge hither to avoid the persecution in his country, with much industry recommended himself to many charitable persons, and among the rest to Mr. Boyle, by communicating to them many secrets in chemistry, and improvements in agriculture, and other useful novelties; by his general correspondence abroad; of which he has published several treatises. Besides this, he was not unlearned; zealous and religious; with so much latitude as easily recommended him to the godly party then governing, among whom (as well as Mr. Boyle and many others, who used to pity and cherish strangers) he found no small subsistence during his exile. I had very many letters from him. Claudius, whom you next inquire after, was his son-in-law, a professed adeptus, who by the same *methodus mendicandi*, and pretence of extraordinary arcana, insinuated himself into acquaintance of his father-in-law: but when or where either of them died (though I think poor Hart-

lib's was of the stone), or what became of them, I cannot tell:——though I conjecture it was whilst he resided at Oxford, after his return from travel, where there was then a famous assemblage of virtuosi: Drs. Bathurst of Trinity, Dickenson of Merton, Wren, now Sir Christopher, Scarburgh, Seth Ward (afterwards Bishop of Sarum), and especially Dr. Wilkins (since Bishop of Chester), the head of Wadham College, where these and other ingenious persons used to meet to promote the study of the new philosophy, which has since obtained."

It is rather remarkable that in writing to Dr. Worthington on the 14th of February, 1661-2, Hartlib almost prophetically observes:—"This may be the last of mine for aught I know." And strangely enough his correspondence, long and agreeably maintained, thus abruptly terminated; no answer appearing to have been sent to the Doctor's later letter to him, nor any mention being made in his diary of any circumstance to account for Hartlib's silence.

Among the records of the State Paper Office relating to Charles II.'s reign,* we find a MS. under date April 9, 1662, (two months later than the letter to Dr. Worthington), addressed by Samuel Hartlib to Secretary Nicholas, stating that Robert Shaw is to be the

* Cal. of State Papers, D. Series, 1661-62. Mary A. E. Green. 8vo. 1861.

name inserted in the Warrant for £1000 for special service, of which Sir John Morley had spoken to him, being a permit to transport certain foreign coin free of duty.

This is the latest evidence we have of his being alive; so that, all circumstances taken together, it is probable that his mortal career suddenly closed in 1662. He had long been a patient martyr to excruciating bodily suffering, and had endured more than four years of distressing poverty: the result of what may be called improvident liberality, expending all his means with uncalculating generosity, while his only source of income was dependent on the stability of a new system of government, against the contingencies of which it never appears to have formed any part of his plans to make provision for a day of adversity. The Parliament of the Commonwealth allowing his pension to become in arrear to the amount of £700, he found himself at the Restoration heavily burdened with debt. Greater than all the poignant sufferings of an enfeebled frame are the heart-rending griefs of the stricken Christian, surrounded by relatives helplessly and hopelessly seeking his wonted support, and yet not without friends who, with every desire to assist, acknowledge their inability to afford deserved competence. The times were out of joint, everythiug made against this eminent, philosophic-minded man, whose sun unfortunately set sadly and gloomily in a threatening sky.

Samuel Hartlib was probably not more than between fifty and sixty years of age at the time of his decease, and it is a singular circumstance that a person so distinguished as he was among a large and learned circle of society, should have died so obscurely, that neither the time of his decease nor even the place of his burial should have been anywhere recorded. Unless, indeed, we attribute the occurrence to his forlorn condition and the strange character of the times, especially during the earlier portion of Charles II.'s reign, when party spirit ran high, and all who had become conspicuous as in any way favouring the Commonwealth were liable to censure, if not to disgrace and penalty. If he went to Oxford, or elsewhere, in hopes to better his situation, as well as his health, such a removal from the metropolis would account in a great measure for this apparent neglect.

In reviewing the circumstances of his life, it is reasonable to suppose that he enjoyed the advantages of a religious training and a liberal education, his parents being persons of some distinction, honourably connected, and his father extensively engaged in commercial enterprise abroad. Hartlib was most likely also intended for trade, as he seems to have been originally employed in some kind of mercantile agency in London, to which fact we are disposed to attribute the business-like tact observable in whatever he undertakes. In his arrangements for schools and

for colleges, in his measures for extending rural economy, in his plan of an office of address, and, in short, in all matters under his own immediate direction, we find every performance reduced to a system; the design always being to promote the public weal by some hopeful philanthropic scheme, either educational, religious, or political; and the better to carry out a plan of such enlarged usefulness, he was unwearying in searching for truth, in attaining information, in surrounding himself with varied talents, and in engaging, as best he could, the services and assistance of good men's pens and purses. He seems to have been particularly endowed by nature with a disposition and abilities eminently calculated for the furtherance of this herculean labour, at a period of our history when it was a marvel to find such a living monument of public usefulness, moving, too, in no ordinary sphere, but approved, commended, and extolled by men of all ranks, degrees, sects, and parties, both at home and abroad.

He was a man of various and refined tastes; indeed it is interesting to observe how happily he associated himself with scholars of every grade; and, without evincing any profound knowledge of literature or science, often acquiring much of their own enthusiasm in their several pursuits. Such a disposition shows both an elevated and active mental constitution, rising above all mere sordid desires, happy only in a society where mental endow-

ments predominate. But he was a decided utilitarian, and too much a man of business routine, merely to saunter listlessly through academic groves; and, consequently, always kept his mission in view. He loved natural history for its bees and silkworms; mechanical philosophy for its engines; botany for its grasses and grains; and chemistry for its manures and composts. It is not surprising, therefore, to find him silent on branches of study which were remote from his object, as not appearing capable of any immediate productiveness to the community at large.

His literary efforts were confined to some translations, on which he was early engaged, and it is not unlikely that they were at first undertaken as essays, in studying English, his adopted language for his future life. He also wrote many prefaces, conducted a very extensive correspondence, and edited most, if not all, of the works that were published by himself. He may have been led to persuade Milton, in 1644, to engage his pen on the important subject of education, influenced by the combined circumstances of the difficulties he had early experienced while educating himself in England; and from his connection with Comenius, and with John Durie, both advocates for a reformation in schools. It is known that Comenius was invited to England by the Government in 1641, with a prospect of carrying out his improvements, but the commencement of the Civil war induced him to leave for Sweden. He was a voluminous

writer, many of his works partaking of the subjects of his abstruse researches, such as prophecies, revolutions, the ruining of Antichrist, the millennium, and other polemical and mystical subjects. He was, however, a Protestant divine, and greatly distinguished himself in 1631 as a Grammarian.

Hartlib's income not exceeding £300 or £400 per annum, he appears to have been necessitated to practise much method in his benevolence, which seems to have been principally bestowed in acknowledgment of some services to forward his great measures of public usefulness. In this spirit he supported, in his own house, Adam Speed, a gentleman conversant with husbandry, and the author of *Adam in Eden*, while composing one of his works. Gabriel Plattes was, also, considerably indebted to his fostering care, on which account he left Hartlib his unpublished papers. By such considerate and timely help did Hartlib strive to support and encourage depressed talent, engaged on any subject of public importance promising a useful practical application. A contemporary, in a letter from Flanders, written to Hartlib in 1650, says to him:— "None but yourself, who want not an enlarged heart, but *a fuller hand*, to supply the world's defects, being found, with some few others, to administer any relief to a man of so great merit" as poor Plattes. Many authors acknowledged his kindly aid in their adversity by addressing their works to him, among whom may

be mentioned J. Pell, Master of Arts, who wrote "An Idea of Mathematics," addressed to Samuel Hartlib, Esq., printed in 1651, duodecimo, at the end of "The Reformed School," written by J. Durie, having been previously written in English and in Latin. Hartlib wrote a letter to Dr. Worthington, relating the decease of this scholar in abject wretchedness in St. Giles's. But alas! the catalogue of the wants, miseries, and drudgery of those who are scribes for their daily bread is not limited to the experience of this singularly benevolent man, although he wrote when such distressing cases were conspicuous in our streets. Grub Street is no more! but the multitude of authors obliges many task-workers to fare as sadly as any of the fraternity in the days of Milton and Hartlib.

He interested himself in forwarding the early prospects of Sir William Petty, while just entering on active life, in very humble circumstances, and in 1647 induced him to write on the Advancement of Learning. And with Petty, Boyle, Wren, and other celebrities in science, he maintained constant correspondence on matters of public value, although they were then but slowly gathering interest among that select few who eventually formed themselves into an organised society, somewhat resembling one of his own contemplated colleges, but on a more simple model.

Hartlib's most prominent scheme was his long-cherished MACARIA. This was a thoroughly Utopian

institution, but it had acquired a degree of stability in his own mind, as frequently happens when a favourite theory has been for many years entertained. The public however are less indulgent than the castle-builder, and rudely sneer, or mildly turn a deaf ear to the charmer. Hartlib constantly alludes to Macaria in his correspondence, and his friends may have indulged him in his dreams of its possible realization. But that which was based on fictions shared the usual fate of fictions, for its author, through twenty years, could never proceed beyond the visionary conception. Still even the *dreams* of men imbued with a benign philosophy may not be entirely without their use, and even this romantic production may have led many to think on improvements, or fascinated them into paths of usefulness that had otherwise been unconsidered. But, as for himself, he saw no difficulty in the institution he proposed, and even ventured to speak of an appropriation of its funds to the publication of valuable treatises for popular information. His writing to Dr. Worthington in such a strain renders it manifest that Hartlib, at least, had no misgivings on the subject.

In 1651 he promoted propositions for a College of Husbandry with a better promise of success, as it interested a large class of the community. The age, however, was blind to the offered advantages; and, indeed, it has required the further experience of two hundred years to convince mankind of the utility of

such an establishment; for it was not commenced till the middle of the present century. So slow is the progress of improvement, that it is only when some great good is accomplished that we awaken to a sense of our dreaminess and sluggishness from age to age. And let it be remembered, that it was against this dead weight of opposition, and worse, of apathy, that Hartlib had to contend. There was a prevailing fear of breaking up and discarding good time-honoured usages. The experience of an ancestor remained long in a family as an invaluable heirloom. What had been was best, especially if the experience of a century or more could be appealed to, no stronger evidence being required. Innovations were rare, and innovators were obnoxious.

But improvement is irresistible; we may delay, but cannot stem its onward progress. Year by year some little advance is made, and eventually the stagnant stream bursts through every barrier. Justly to estimate Hartlib's labours, toiling with his pen, publishing, and daily labouring to support deserving worth and zealously to spread useful knowledge, we must bear in mind how dreary and thankless, how apparently unproductive, were all his kind offices, when we except the few who admired and were astonished at the magnitude of his efforts to assist his less favoured fellow-creatures. 'It is marvellous that, in an age when mysticism, magic, astrology, and witch-

craft had scarcely begun to decline, he should so manfully have carried out to the last an uniform, consistent system of charitable and benevolent schemes, looking, the while, far beyond any human reward.

We are constrained to consider Samuel Hartlib's prevailing pious disposition as governing, guiding, and outweighing all other obligations. He advocated the acquirement of knowledge, and the means of improving its attainment, and strenuously laboured to extend every useful art and trade favouring industry and tending to strengthen the arms of the state; but these were accessories to brighter hopes, they were to be employed but as the means to a far nobler end, and were not esteemed by him as man's *summum bonum* in this life. That he was, therefore, rather out of his sphere, while occupied in the mercenary operations of ordinary business, we may surmise from the absence of all allusion to commercial gains in his corpondence; while his letters, on the contrary, are replete with learned allusions, theological matters, references to men of letters, and to subjects of a literary or philosophical bearing. That he was, from an early period, premeditating a declaration of his own estimate of his true mission, we gather from his "Reformed Spiritual Husbandman," which work he professes was but a proparative to other like productions. He likewise assures the reader that, although he has hitherto occupied himself on subjects, such as Husbandry,—"the study

thereof is *not next to my heart.*" And candidly professes but to have "*played* the husbandman," to gratify a public necessity, rather than his own individual taste. Such was the deliberate statement he made after more than twenty years experience, and active employment in such comparative drudgery, working, as he must have done, so thoroughly against the grain, in defiance of his natural bias and religious fervor. He does not, however, appear to have succeeded as a theological writer, although he must have devoted his energies to appropriate preparatory studies for above twenty years previous to his thus expressing the conviction of his heart. He is certainly not, at the present time, generally supposed to have contemplated any such change of occupation. It is more than likely, whatever might have been his own estimation of his abilities, in 1652, that the result of his publication, combined with the advice of trusty friends, assured him that his sphere of usefulness would be materially curtailed if he seriously persisted in abandoning the one pursuit for the other: in which eminent authors already abounded, while he had opened for himself a field calculated to yield unbounded treasure. In this respect Hartlib's is far from being an isolated case, either in his own or in the present day. It is the fate of genius in the varied walks it pursues, to despise difficulties, seeing the remote as present, and the present as to be overleaped at one bound. But it is with

the philosopher as with the architect, he must design and build for others rather than for himself, and largely conform to the popular cry, however much disposed to set up his own judgment against that of the world.

Samuel Hartlib's life throughout excites our admiration. His piety and enthusiasm, his varied tastes, and plastic genius are conspicuous in all his multifarious labours. In whatever he was engaged we observe the same earnestness, ardour, and sobriety of conduct. He is always solid and sincere, and begets in us, at a glance, a predisposition in his favour; we see in him the meek true Christian and the gentleman. His amiability is without affectation, he is obliging without sycophancy, and religious without intolerance. He never assumes mental superiority, or knowledge beyond his information, and while directing oppressed talent into channels of enlarged usefulness, his judgment and experience rather suggest than dictate. Had it been his lot to be differently situated, and blessed with a superior education, he would have proved himself a sublime genius: for under great personal disadvantages, together with the adverse influence of distracted and dissolute times, he worked wonders to ameliorate the condition of society, with little other encouragement than the approval of his own conscience. He was a bright example of the astonishing amount of good that may be individually accumulated and dis-

pensed by uniform and untiring zeal in promoting one great well-ordered design, when actuated by an unselfish disposition, liberally aiming to effect only through the purest means the temporal as well as the spiritual welfare of mankind.

BIBLIOGRAPHICAL CATALOGUE

OF

SAMUEL HARTLIB'S PUBLICATIONS.

I.

[Jan Amos Komenský.]

CONATUUM Comenianorum præludia ex Bibliotheca S. H. —Oxoniæ, Excudebat Guilielmus Turnerus. *Academiæ Typographus.* 4to. Anno 1637.

"Ad Lectorem," two pages subscribed Samuel Hartlibius. A second title page commences—"Porta Sapientiæ Reserata: sive Pansophiæ Christianæ seminarum. &c. Auctare J. A. Comenio. Oxoniæ. 1637." Then follow pages 1 to 52, and 3 leaves not paged, headed, "Præcipua Capita Didacticæ Magnæ, &c."

II.

Reverendi et Clarissimi viri Johannis Amos Comenii, Pansophiæ prodromus, &c. 12mo. — Londini. 1639.

"Lectoribus, veræ Sapientiæ Cupidis, S." by Samuel Hartlibius, dated "Londini ex ædibus meis. Cal. Januar. Anno 1639," consists of 8 pages.

Comenius seems to have designed translating "his Pansophical Labours," according to a letter from Hartlib to Dr. Worthington, dated Jan. 30th, 1659. On which Mr. Crossley makes note that:—"From this period to the time of his death, Comenius was too much absorbed in controversy and prophecy," to publish the works named; their object "was to simplify and shorten, by a kind of royal road to learning, all studies, arts, and sciences."

III.

A reformation of Schooles, designed in two excellent Treatises: The first whereof summarily sheweth, the great necessity of a generall Reformation of common Learning. What grounds of hope there are for such a Reformation. How it may be brought to passe. The second answers certaine objections ordinarily made against such undertakings, and describes the severall Parts and Titles of Workes which are shortly to follow. Written many yeares agoe in Latine by that Reverend, Godly, Learned, and famous Divine Mr. John Amos Comenius [Komenský], one of the Seniours of the exiled Church of Moravia. And now upon the request of many translated into English, and published by Samuel Hartlib, for the generall good of this Nation. 4to.—Lon-

don, Printed for Michael Sparke senior, at the Blew Bible in Greene Arbor, 1642.

This translation consists of 94 pages without preface. Page 61, gives a second Title-page :—"A Dilucidation, answering certaine objections, made against the endeavours and means of Reformation in Common Learning, expressed in the foregoing Discourse. By Mr. John Amos Comenius."

Commencing at page 90, and occupying four pages, are "The severall Titles of the seven parts of the Temple of Christian Pansophie." These briefly are, 1, The threshold of the Temple of Wisedome; 2, the Gate; 3, the outward Court; 4, the middle Court; 5, the innermost Court; 6, the last and most secret, The Holy of Holies, and 7, the Fountain of living Waters.

IV.

A Continuation of Mr. John-Amos-Comenius School-Endeavours. Or a Summary Delineation of Dr. CYPRIAN KINNER *Silesian* his Thoughts concerning Education: Or the Way and Method of Teaching. Exposed to the ingenuous and free Censure of all Piously-learned men. The which shall shortly be seconded with an Elucidarium or Commentary to open the sense of whatsoever is herein contained, chiefly of what is paradoxall and obscure (if any such shall appear to be.) Together with an Advice how these Thoughts may be successfully put in Practice. Translated out of the Original Latine, transmitted to

Sam. Hartlib: and by him published, and in the name of many very Godly and Learned Men, recommended to the serious Consideration, and liberall Assistance of such, as are willing to favour the Regeneration of all Christian Churches and Common-wealths; but more especially the Good and Happines of these United Kingdoms. *Published by Authority.*—Printed for R. L. in Monks-well street. 4to. [1648.]

The treatise opens with "A Brief Information concerning Doctor Kinner and his undertakings," occupying four pages; next, "The Summary Delineation of Doctor Cyprian Kinner," of two pages; then the treatise paged 1 to 9, and concludes with a page headed "Doctor Cyprian Kinner's Vows to the Almighty God, sent from Dantzick, the fift of Aug. 1684, to Samuel Hartlib," and another page, with "An Advertisement to the Noble and Generous Lovers of Learning," recommending any one, requiring information, to "repair to Master Hartlib's House, in the great open Court in Duke's-place, and satisfaction shall be given to all their desires."

V.

A briefe relation of that which hath been lately attempted to procure Ecclesiasticall Peace among Protestants. Published by Samuel Hartlib.—London, Printed by J. R. for Andrew Crooke,

and are to be sold at his shop in Pauls Churchyard, at the signe of the Green Dragon. 4to. 1641.

This pamphlet consists of 35 pages, with preface. It is observed on the first page—"When in the yeer 1628, John Dury was in Prussia, Minister to the English company of Marchants residing at Elbing, he was sent unto, dealt withall, and moved by Dr. Godeman a wise, godly, and learned man, one of the King of Swedens Privy Councellors, and Judge of his high Court in those parts, to second him in a businesse of Ecclesiasticall Unitie amongst Protestants;" the details of which matter form the body of the work.

VI.

A description of the famous Kingdom of MACARIA, shewing its excellent government, wherein the Inhabitants live in great Prosperity, Health and Happiness; the King obeyed, the Nobles honoured, and all good men respected; Vice punished and virtue rewarded. An example to other Nations. In a Dialogue between a Schollar and a Traveller. —London, Printed for Francis Constable. 4to. *Anno* 1641.

The pamphlet, dedicated "To the high and honourable Court of Parliament," "affords a sort of adumbration (says Mr. Crossley) of what the Macaria was expected

to accomplish." The author acknowledges to have delivered his "conceptions in a Fiction, as a more mannerly way, having for my pattern Sir Thomas More, and Sir Francis Bacon." He dates it 25th of October, 1641, and has one leaf of dedication, followed by 14 pages of description.

VII.

A short Letter modestly intreating a Friend's judgement upon Mr. Edwards his Booke, he calleth an Anti-Apologie: with a large but modest Answer thereunto.—London, Printed according to order. 4to. 1644.

On the back of the title page is a short letter from Samuel Hartlib, written "From my house in Dukes-place, in great haste, Aug. 5th." His address commences, "Worthy Sir," but gives no name. "I have heard (he says) of Mr. Edwards" book, "as I must needs doe, for all the City and Parliament rings of it. The most of them cry it up, and some few cry it downe. Truly, Sir, I could cry too, but neither up nor downe; for my heart is big with weeping, and I could wish my head a fountaine of teares, to bewaile the sad effects which are likely to follow upon these differences of religion, which are fallen out among Brethren."

The "large answer" consists of 36 closely printed pages, signed, "Hezekiah Woodward," and dated "From my house in Aldermanbury, 23 Aug. 1644,"

followed by three pages of an address "To the Reader," ending "Imprimatur, Joseph Caryl."

It thus appears that Hartlib wrote to his friend Woodward, (whose judgment, he says, "hath not deceived me these sixteen years,") to give his opinion of Mr. Edwards' book. Now 16 years prior to 1644, the date of his letter and publication, takes us back to 1628, about or before which year Hartlib probably first came to England.

VIII.

Of Education. To Master Samuel Hartlib. 4to. [June 5, 1644.]

This celebrated tract of eight pages, written by John Milton, seems to have been published without any regular title page. The first page gives in one line at the top, "Of Education. To Master Samuel Hartlib." It is pretty well printed, in small type, 48 lines on a page.

Wood says of John Milton, that, in 1635, he was incorporated Master of Arts. He wrote:—

"Of Education," a tract addressed to Mr. Samuel Hartlib. In this treatise he prescribed an easy and delightful method (says Wood), for the training up of gentry to all arts of literature, that they might at the same time, by like degrees, advance in virtue and abilities to serve their country, subjoining directions for their obtaining other necessary or ornamental accom-

plishments. And to this end, that he might put it in practice, he took a larger house, where the Earl of Barrimore sent by his aunt the Lady Rannelagh, Sir Thomas Gardiner of Essex, to be there with others (besides his two nephews), under his tuition. But whether it were that the tempers of our gentry would not bear the strictness of his discipline, or for what other reasons I cannot tell, he continued that course but awhile."—[Wood's Fas. Ox. 3rd edition, Vol. ii. p. 483.]

IX.

Considerations tending to the happy accomplishment of England's reformation in Church and State: Humbly presented to the Piety and Wisdome of the High and Honourable Court of Parliament. 4to. [1647.]

The head title reads thus:—"A brief Discourse concerning the Accomplishment of our Reformation: Tending to shew, that by an Office of Publike Addresse in Spirituall and Temporall Matters, the Glory of God, and the Happinesse of this Nation may be highly advanced." Printed in large open type, with double marginal lines on each page.

This pamphlet opens with two leaves of prefatory matter, one half of the first page being the only title page; and the first page of the Discourse opens in like manner with the second half-title page.

Samuel Hartlib, in addressing the "Right Honourable Senators," says, "I make account that I can have no true delight in the enjoyment of this Earthly Life of mine any further, then I find myselfe usefull to others;" and continues, "I am comforted herein, that I have the testimony of my Conscience assuring mee, that I have sincerely spent and laid out myselfe wholly to this effect. And that although I have been carelesse of my selfe as to this world (sine invidia lucri), yet I have seen alwayes God's hand in the midst of many straits and difficulties supporting me, and shewing a way to proceed, when I found my selfe at a stand."

Thirty-six pages of preliminary matter are followed by that which is the principal object of the treatise—"Of the Office of Addresse." Its nature we gather from this remark, that—"Wee would advice that a Certaine Place should be designed by the Authority of the State, whereunto all Men might freely come to give information of the Commodities which they have to be imparted unto others," managed by a "Master of Addresses." It was proposed to have it in "two Parts or Branches: the one for Bodily, the other for Spirituall Matters." In each there were to be Inventories and Registers of all "Commodotis, Persons, Employments, Offices, Charges, and Things." The charge for information was to be "but a penny or two" to the rich, "but to the Poore all is to bee done freely." At the end is "Anno 1647."

X.

A further Discovery of the Office of Publick Address for Accommodations.—London. pp. 34. 4to. 1648.

Reprinted in the Harleian Miscellany, edited by Oldys and Park. 4to. 1810. Vol. vi. p. 14. And the same, 8vo. Vol. vi. 1810. p. 158.

XI.

The Advice of W. P. to Mr. Samuel Hartlib, for the Advancement of some particular Parts of Learning. 4to.—London, printed *Anno Dom.* 1648.

This pamphlet, consisting of 34 pages, commences with a short letter from W. P. afterwards Sir William Petty, "To his honoured Friend, Master Samuel Hartlib," dated "London, Jan. 1, 1647-8." He first alludes to his newly invented Pentograph for double writing; from the profits of which, if patronised, sufficient means might be raised to carry out his "flying thoughts concerning the advancement of real learning in general, but particularly of the education of youth." He recommends, "That all children, though of the highest rank, be taught some genteel manufacture in their minority," the designations and nature of some being rather singular, such as:—

"Making Watches, and other trochilic motions.

"Making musical instruments.

"Navarchy, and making models for buildings, and rigging for ships.

"The confectioner's, perfumer's, or dyer's arts.

"Anatomy, making skeletons, and excarnating bowels."

He proposes the erecting of a "gymnasium or college," with theatre, museum, &c. professors, officers, &c.

Reprinted in the Harl. Misc. edited by Oldys and Park, 4to. 1810. Vol. vi. p. 1. And the same, 8vo. 1810. Vol. vi. p. 141.

XII.

Clavis Apocalyptica: or, A Prophetical Key: By which the great Mysteries in the Revelation of St. John and the Prophet Daniel are opened; It beeing made apparent that the Prophetical Numbers com to an end with the year of our Lord, 1655. Written by a Germane D[octór], and now translated out of High-Dutch. In two Treatises. 1. Shewing what in these our times hath been fulfilled. 2. At this present is effectually brought to pass. 3. And henceforth—is to bee expected in the years neer at hand. London, Printed by William Du-Gard for Thomas Matthews, and are to bee sold by Giles Calvert, at the Black-Spread-Eagle at the West-end of St. Paul's, 1651.

This work is a neatly printed 12mo. containing a Dedication of 5 pages by Samuel Hartlib, addressed "To the right honourable Oliver St. John, Lord Chief

Justice of the Court of Common-Pleas," of whom he says:—"in publick you have owned mee towards the Parliament, and procured an aspect from that High and Honorable Court towards mee, to set me apart as an Agent for the Advancement of Universal Learning and the Public Good, which I confess is an emploiment, whereunto from my youth God hath naturalized my affections." He subscribes himself "your truly devoted Orator and faithful servant."

From page 1 to 79, printed in small type, is, "An Epistolical Discours, from Mr. John Durie to Mr. Sam. Hartlib, concerning his Exposition of the Revelation. By way of Preface thereunto." It is dated 1650. *Clavis Apocalyptica* has two brief pages of an address to the "Judicious Reader!" then follow 163 pages in large type, clearly printed, concluding with two more pages, "A List of the things which are shortly to com to pass, collected out of the XI. and XVI. Chapters of the Revelation."

XIII.

A discours of Husbandrie used in Brabant and Flanders; shewing the wonderfull improvement of Land there; and serving as a pattern for our practice in this Common-wealth. 4to.—London, Printed by William Du-Gard, Anno Dom. 1605 [1650].

In his Epistle Dedicatory, "To the Right Honorable

the Council of State," after commencing in his usual scriptural and quaint style, Samuel Hartlib says of himself:—"It hath been one of my aims, to have the honor (if possibly I could attain unto it) of serving the Publick gratis, and at mine own cost, to the best things: So I have made it a part of my Agencie, to provok others, to do the like, by offering unto everie one, the things which might bee most advantagious unto themselves, by doing service unto others. And how far my affections have carried mee beyond my abilities in this cours, I need not to mention: this hath onely been my comfort, that having served my generation generously and freely, I never had caus to repent of what I had done, whether it were resented by others, or not."

He speaks of Agriculture as "being one of the noblest and most necessarie parts of industrie belonging to a Common-wealth, the first ground of mutual trading amongst men, and the well-spring of wealth in all well ordered societies."

Of his own acquaintance with the subject of Husbandry he observes:—"I cannot say much of mine own experience in this matter, yet providence having directed mee by the improvement of several relations unto the experiences and observations of others, I finde myself obliged to become a conduit-pipe thereof towards the Publick."

The author of the Discourse remarks, "I did think I

had understood that point [in regard to the condition of land and proper seed], when I went out of England, after thirty years' experience in Husbandrie, and having improved my land as much as any man in this kingdom;" but his foreign experience taught him to improve "heathie and sandie lands."

This pamphlet is neatly and closely printed; with an obvious error of 1605 for 1650 on the title page. The Dedication occupies 3 leaves, and the Discourse 26 pages. Two years later he published—

Discourse of Husbandrie used in Brabant and Flanders; shewing the wonderful improvement of Land there; and serving as a pattern for our practice in this Common-wealth. The second edition, corrected and Inlarged.—London, Printed by William Du-Gard, dwelling in Suffolk-lane, near London-stone. small 4to. *Anno Dom.* 1652.

"The Epistle Dedicatorie," by Samuel Hartlib, "To the Right Honorable the Council of State," occupying 3 leaves, is followed by his address to the reader. In the latter he remarks—"This second edition of the Brabant Husbandrie is not so much enlarged as was intended by mee, becaus I expected something from Sir Richard Weston, which I have not been able to obtain."

At the end, after "Finis," are two letters from Samuel Hartlib to Sir Richard Weston; the first dated

"From my Hous at Charing-Cross, over against Angel-Court, the 2nd of Maie, 1651." He commences—"I am very credibly informed that you are the author of the Discours which I have heretofore published under the name of Brabant Husbandrie,"—and offers him his warm acknowledgments.

XIV.

An Invention of Engines of Motion lately brought to perfection. Whereby may be dispatched any work now done in England or elsewhere, (especially Works that require strength and swiftness) either by *Wind, Water, Cattel* or *Man.* And that with better accomodation, and more profit then by any thing hitherto known and used.—London, Printed by T. C. for *Richard Woodnoth,* next door to the *Golden heart,* In Leaden-Hall-Street. 4to. 1651.

A quarto tract very indifferently printed on coarse paper, consisting of one leaf for the title page, a second leaf with an extract from Bacon's *Novum Organon,* followed by two letters having no signature, paged 1 to 12, without any comment from Samuel Hartlib, to whom they are addressed. They were, however, written by Cressy Dymock, a writer on agricultural topics. See a reprint of this singular production at the end of the present volume.

XV.

An Essay for Advancement of Husbandry-Learning: or propositions for the erecting a Colledge of Husbandry: and in order thereunto for the taking in of Pupills or Apprentices. And also Friends or Fellowes of the same Colledge or Society.—London, Printed by Henry Hills. sm. 4to. 1651.

Samuel Hartlib, addressing the "Courteous Reader," commences—"I find by experience, that it is nothing but the narrowness of our spirits that makes us miserable; for if our hearts were enlarged beyond our selves, and opened to lay hold of the advantages which God doth offer, whereby we may become jointly serviceable unto one another in publicke concernments; we could not be without Luciferous Employments for our selves; nor unfruitful to our neighbours, as now for the most part we are." Adding:—"For mine owne part, although I can contribute but little; yet being carried forth to watch for the opportunities of provoking others, who can do more, to improve their Talents, I have found experimentally that my endeavours have not been without effect."

He speaks of the Essay as hints "which have a long time lain by me;" and inquires: "Why may we not conclude that in the science and trade of husbandry, which is the mother of all other trades and scientificall Industries, a Collegiall way of Teaching the Art thereof

will be of infinite usefulness?" And again: "If the least part of all Industrie is highly improved by Collegiall Institution and Education, how much more may the chief part, and as it were the very root of all wealth, be advanced to perfection by their means?" This essay, therefore, is offered as "a hint of this matter, that it may be further in due time ripened, and with more mature considerations brought to perfection."

The Essay, after preliminary explanations, suggests: "that well-wishers to their countrey's wealth and propriety; be pleased to contribute such sums to this good and laudable Worke, as in their own wisdomes and bounties appear necessary, and deliver the same into the hands of Mr. Samuel Hartlib, whose abundant zeale for the publique good, renders him most worthy to be entrusted therewith, till there shall be a competent stock obtained."

The Essay closes at page 11, and proceeds with a letter on the same subject, ending at page 16, without signature but substituting ——— as a kind of mark.

The address to the reader occupies 2 leaves, and the Essay, &c. 17 pages, closely printed.

XVI.

The Reformed Husband-Man; or a brief Treatise of the Errors, Defects, and Inconveniences of our English Husbandry, in ploughing and sowing for corn; with the Reasons and general Remedies; and a

large yet faithful Offer or Undertaking for the benefit of them that will joyn in this good and publick Work. Imparted some years ago to Mr. Samuel Hartlib; And now by him re-imparted to all ingenuous Englishmen, that are willing to advance the Prosperity, Wealth, and Plenty of their Native Country.—London, Printed by J. C. 4to. 1651.

Samuel Hartlib addresses the "Christian Reader" with the statement, that "It is a common complaint, that Trade doth decay, and that the poor are multiplyed for want of employment," the natural result of "civil warres." He calls on all to act as best they can, and avoid a selfish spirit. His own effort consists in offering this "brief Treatise and the propositions which were imparted unto me above 3 years ago;" and he adds, "now the hopes of our public settlement have invited me to put them forth."

From page 1 to 12 is in the form of a letter, without signature or mark, addressed to Mr. Hartlib, and from page 12 to 14, is entitled, "The most especiall Persons (or Purposes) that may readily advance or recover estates, by joyning to set forward the practice of this work,"—consisting of seven propositions amounting to a kind of Insurance to secure property, annuities, &c.

This pamphlet has an address to the reader on the first leaf, and the Discourse occupies 14 pages, closely and indifferently printed.

XVII.

Samuel Hartlib his Legacie: or An Enlargement of the Discourse of Husbandry used in Brabant and Flaunders; Wherein are bequeathed to the Common-wealth of England more Outlandish and Domestick Experiments and Secrets in reference to Universall Husbandry. Entered according to the late Act concerning Printing.—London, Printed by H. Hills, for Richard Wodenothe at the Star under St. Peter's Church in Cornhill. 4to. pp. 131. 1651.

A specimen of superior printing. The first three leaves without paging contain Hartlib's address, and Sir Richard Weston's Legacy to his sons.

From page 1 to 108 is "A large letter, &c. to Mr. Samuel Hartlib," and by the double line, mark, or monogram at the end it would appear to be from the pen of Cressy Dymock; there are also five other letters with the same mark, ending at page 127. The first letter is simply dated Anno 1651, but we learn from the commencing paragraph that the correspondent had not long returned from France. A different authorship may be due to the first and largest communication, which may have been written by Robert Child, as suggested by Harte in his Essays on Husbandry, and by Sir Egerton Brydges in the Gentleman's Mag. Vol. 72, p. 12. The work consists of one general answer to the

inquiry, "What are the actual defects and omissions, as also the possible improvements in English husbandry?"

The edition of 1655, in the British Museum, has the title: "Samuel Hartlib his Legacy of Husbandry. Wherein are bequeathed to the Common-wealth of England, not only Braband and Flanders, but also many more Outlandish and Domestick Experiments and Secrets (of Gabriel Plats and others) never heretofore divulged in reference to Universal Husbandry. With a Table shewing the general Contents or Sections of the several Augmentations and enriching Enlargements, of this *Third Edition.*—London, Printed by J. M. for Richard Woodnothe, in Leaden-[hall] Street, next to the Golden-Heart. 1655."

The work varies from the edition of 1651, as it commences with 11 pages of "Contents or Sections;" extracts on two leaves by way of "An Introduction," and contains, in 303 pages of small type closely printed, "A large Letter concerning the Defects and Remedies of English Husbandry, written to Mr. Samuel Hartlib;" with various other letters and annotations.

At page 104, an experiment on Barley-corn is given in a letter signed C. D., 1650, followed by a letter "upon the foregoing secret," speaking of "Mr. Dymock's great experiment on his Pease and Barley," signed B. W.

C. D. writes again, p. 108—111.

At page 118 commences, "Dr. Arnold Beati's Annotations upon the Legacy of Husbandry. Paris, the first of July, 1651;" which ends at page 302. And on the last two pages is "An Advertisement to the City and County," relating to a new fire and garden engine.

Samuel Hartlib, in his "Legacy," laments greatly that no public director of husbandry was established in England by authority: and that we had not adopted the Flemish custom of letting farms on improvement. See "Essays on Husbandry," Walter Harte, 8vo. 1764.

XVIII.

Cornu Copia. A Miscellanium of lucriferous and most fructiferous Experiments, Observations, and Discoveries, immethodically distributed; to be really demonstrated and communicated in all sincerity. —[London, 1652?]

This tract of 16 pages commences with the above title at the top of the first page, and proceeds:—

"Imprimis. To discover a certainty to raise £2000. *per annum de claro*, &c.

"Item, A certainty another way, with £500. stock, &c.

"Item, A certainty, with less than £500. stock, &c."

At page 2, the subject changes to:—"These following relate to the exceeding great advantage of Husbandry."

"Imprim. A seed to be sown without manuring, &c.

"Item, Another kind of seed, &c.

"Item, A most excellent discovery, with one slight plowing, &c." And so on to page 11.

At page 12 commences, "Generall Accommodations." Thus :—

"Whosoever shall have monies to let forth upon interest, &c.

"And sundry purchases, sales, and annuities; any one requiring house or lodgings; goods or furniture; lost property; services; law; debtors; agents; official situations; education; travel." And inquires about relations abroad. Concluding with a brief address to gain the credence of "the generous reader."

This appears to be similar in many respects to the "Discovery of the Office of Publick Address," 1648.

There is a copy of this tract bound up with a series of Hartlib's publications, in the British Museum (441. b. 23, 4), which is catalogued as [By S. Hartlib], and "Imperfect, wanting title page."

But in the Harleian Miscellany, 4to. edited by Oldys and Park, Vol. vi. 1810, this tract is quoted at page 27, without any further title page than that here given, and therefore, without publisher's name or date. The editors make no note on this publication, but place it in the collection immediately after "Hartlib's Discovery of the Office of Publick Address, &c." Indeed, it is not

unlikely that it formed an Appendix to one of the editions.

It also appears reprinted in the Harleian Miscellany, 8vo. Vol. vi. page 540.

XIX.

A Rare and New Discovery of a speedy way, and easie means, found out by a young Lady in England, she having made full proofe thereof in May, Anno 1652. For the feeding of Silk-worms in the Woods, on the Mulberry-Tree-leaves in Virginia: Who after fourty dayes time present there most rich golden-coloured silken Fleece, to the instant wonderfull enriching of all the Planters there, requiring from them neither cost, labour, or hindrance in any of their other employments whatsoever.

And also to the good hopes that the Indians, seeing and finding that there is neither Art, Skill or Pains in the thing; they will readily set upon it, being by the benefit thereof inabled to buy of the English (in way of Truck for their Silk-bottomes) all those things that they most desire. So that not only their Civilizing will follow, thereupon, but by the infinite mercie of God, their Conversion to the Christian Faith, the Glory of our Nation, which is the daily humble prayer of Virginia for Virginia. With two Propositions tending to

England's and the Colonies infinite advantage. —Printed for Richard Wodenothe in Leaden-hall street. small 4to. 1652.

A letter of one page from Samuel Hartlib is first addressed to the "Ingenuous Reader." He observes, "I have in my *Legacie of Husbandry* bequeathed something unto thee concerning silkworms." Instructions occupy 5 pages, followed by a quotation from Du Bartas on the silk-worm, two short poetical pieces, and on the last page "A comparison between the gain and labour of Tobacco and Silk," to show that the gain in a crop of tobacco is but £14. as compared to a crop of silk, which would be worth £60. The treatise consists of 12 closely printed pages. This pamphlet has become exceedingly rare, having been much sought after by American book collectors.

XX.

Twisse's Doubting Conscience Resolved. 8vo. 1652.

William Twisse died in 1645. He wrote "The doubting Conscience resolved, in answer to a (pretended) perplexing Question, &c. Wherein is evidently proved that the Holy Scriptures (not the Pope) is the Foundation whereon the Church is built, &c." 1652. [Bodl. 8vo. B. 137. Linc.] Published by Sam. Hartlib. See Wood's Ath. Ox. 3rd edition. 1815. 4to. Vol. iii. p. 172.

XXI.

Ireland's Naturall History. Being a true and ample description of its situation, greatness, shape, and nature. Written by Gerard Boate. And now published by Samuel Hartlib, Esq. Dedicated jointly to Oliver Cromwell, Chancellor of the University of Oxford; and to Captain Charles Fleetwood, Commander-in-Chief of all the Forces in Ireland. 1652.

Reprinted — See Brit. Mus. Catalogue. "Ireland, Tracts on Natural History, 1860, &c."

XXII.

A Designe for Plentie, By an Universall Planting of Fruit-Trees: Tendered by some Wel-wishers to the Publick.—London, Printed for Richard Wodenothe in Leaden-hall street, over against Leaden-hall. 4to. 1652.

Samuel Hartlib, in his prefatory address to the "Courteous and Ingenuous Reader," says, "it is just that every one should have his due;" and this he does in order: 1st, God's goodness; 2nd, his Providence; and 3rd, the Instruments employed. The latter brings him to consider the author of this treatise, who "is not known unto me: for although I have endeavoured by a diligent search to finde out his name, yet I have not been able to compasse the matter;" but he has heard

he "was an aged Minister of the Gospel." For himself he says, "I claim nothing but the contentment to be the publisher thereof; that I may be instrumentall to advance the comforts of many thereby."

He alludes to a forth-coming work by Mr. Ralph Austin of Oxford, named in "his own Letter in November last, 1652;" and to Mr. Blithe's *Improver Improved.*

The address to the reader occupies 3 leaves, the Treatise 24 pages, having marginal notes. It is a neatly and closely printed pamphlet.

Ralph Austin wrote "A Treatise of Fruit-trees, shewing the Manner of Grafting, Planting, Pruning, and easy Rules of Experience, &c. 4to. Oxon. 1657. 2nd edition. Dedicated to Sam. Hartlib, Esq."—See "Fasti Oxonienses." By Ant. A. Wood, M.A. 3rd edit. By Philip Bliss. Vol. ii. page 174.

XXIII.

The Reformed Spirituall Husband-man: With a Humble Memorandum concerning Chelsy Colledge. And a correspondence with Forreigne Protestants. —London, Printed for Richard Wodenothe, and are to be sold his Shop in Leaden Hall street, next the signe of the golden Hart. 4to. 1652.

This pamphlet consists of 38 pages. The address to the "Intelligent Reader," is by Samuel Hartlib,

who says, "I have of late plaid the Husbandman about Bodily Concernments; that I might gratifie the Publique with some helps of Industry, to relieve the poor, and encrease wealth in Common and Plenty of the Fruits of the Earth unto all;" yet, says he, "I must profess that the studie thereof is not next unto my heart," being more disposed to writings like the present; of which he observes: "These two following discourses are but some preparatives to much more of this kinde, which is in store."

One leaf follows the Address, headed, "A new case of Conscience;" followed with "An answer," extending from page 1 to 32, being a letter from John Dury, dated Dec. 1651, to the Honourable Sir Gregory Morton. And "A Humble Memorandum concerning a correspondence with Forreigne Protestants," from p. 33 to 36; and the remaining two pages refer to "Chelsy-College," for the confirming, and enlarging that foundation.

XXIV.

A Discoverie for Division or Setting out of Land, as to the best Form. Published by Samuel Hartlib, Esquire, for Direction and more Advantage and Profit of the Adventurers and Planters in the Fens and other Waste and undisposed Places in England and Ireland. Whereunto are added some other Choice Secrets or Experiments of Husbandry.

With a Philosophical Querie concerning the Cause of Fruitfulness. And an Essay to shew How all Lands may be improved in a New Way, to become the ground of the increase of Trading and Revenue to this Common-wealth.—London, Printed for Richard Wodenothe in Leaden-hall-street. 1653.

It opens with a preface of three pages addressed to the "Christian Reader," by Samuel Hartlib, who says: "That which is the concernment of all, ought to be the care of all; but no man can make this to be so; except the spirits of men be raised to a pitch answerable to the worth of things offered unto them. For as Seneca saith, Magno animo de rebus magnis judicandum est; alias illarum vitium esse videbitur quod nostrum est." And further, "I have in my station bin faithful to offer objects of this and some other kinde unto the Publike, to provoke every one to minde the best things for their owne and the Publike Good; and although in this endeavour, wherein for many years I have continued in the midst of some difficulties, and all our Changes, and have spent myself thereupon as upon a necessary duty; yet I have found no great Encouragement thereunto from abroad, more then what mine own resolution (to persevere faithful unto the end in well doing) did suggest unto me; nevertheless I hope I shall not faint." And again, "I will very gladly spend and be spent for the good of others, although

for the most part it proves a thankless office, and the more abundantly one is found to love the Publike, the less he is loved."

The treatise consists of 24 pages. The first page begins: "A Discovery for New Divisions, or, Setting out of Lands, as to the best Forme: Imparted in a letter to Samuel Hartlib, Esquire;" signed by his "Most faithful, thankful Friend, and humble Servant, Cressy Dymock," on the 11th page. At page 22 is another letter from C. D. The remainder consists of miscellaneous matters; the last page being "An Advertisement to the Reader concerning the fore-going Expositions of Sal Terræ," that is "Nitre," or "Salpeter;" signed, "Thy willing and most assured servant, Samuel Hartlib."

He published, says Sir Egerton Brydges, in the Gentleman's Mag. Vol. 72, p. 14, a treatise on "Setting Land," also "Adam's Art revived;" but the latter seems to belong properly to Sir Hugh Platt, according to Harte's Essays on Husbandry.

XXV.

A True and Readie Way to Learne the Latine Tongue. Attested by Three Excellently Learned and approved Authors of Three Nations: Eilhardus Lubinus, a German; Mr. Richard Carew, of Anthony in Cornwall; The French Lord of Montaigne. Presented to the Unpartiall, both Publick

and Private Considerations of those that seek the Advancement of Learning in these Nations. By Samuel Hartlib, Esq.—London, Printed by R. and W. Leybourn for the Common-wealth of Learning. MDCLIV.

A quarto of 52 pages, dedicated "To the Right Honourable Francis Rous, Esquire; Speaker of the Parliament of the Common-wealth of England." He observes:—"In the Sphere wherein I have walked, my Aime hath been rather to take away the Difficulties then to lay them open, rather to suggest a Remedie then to discourse of the Diseases; for there is no end of Complaints on all hands, seeing each Party doth lay open the others faults; and few or none tell us, how they ought to be mended." Speaking of "Education, and the Reformation of Schools," he says: "My honoured Friend Mr. John Amos Comenius, and some other Fellow-labours and Correspondents in this Work with my self, have studied to make as little alteration as could be, seeking onely the best Advantages which upon the Ordinary Foundations of School-teaching could be introduced: and in this Endeavour for a great many years we have continued, and many wayes attempts have been made to facilitate the course of Universall Learning, and especially the teaching of Learned Tongues." Adding, "And because it is no small difficultie and hazard to venture upon the contradicting of a Custome so universally received, as is the

Grammatical Tyranny of teaching Tongues; Therefore I am willing to make an Appeal, and seek out an Eminent Patron for this bold Attempt," not doubting an impartial judgment, rather than suspecting "all New Designes as light Projects of unsetled braines." He declares that prosecuting ways to advance learning "hath been a great part of my Study above these twenty years [from 1630-34?]: nor have I been alone in this Work, but many others of great Worth and Abilities, have been obliged to contribute their help unto me." He states that his object in the present Treatise is—"to introduce a Better, Easier, and Readier way of Teaching."

He takes as a motto, the words of Lord Bacon, in his Advancement of Learning:—"All those things are to be held possible and performable, which may be accomplisht by some Persons, though not by every one; and which may be done by the united labours of many, though not by any one apart; and which may be finisht by the Publique Care and Charge, though not by the Ability and Industry of Particular Persons."

The pamphlet consists of the three following treatises:—

"The true and ready way to learn the Latine Tongue, expressed in an Epistolary Discourse of Eilhardius Lubinus, before his New Edition of the New Testament."

The same subject—"Expressed in answer to a

Quere," by the "late Learned and judicious Gentleman Mr. Richard Carew."

And lastly, the same from Montaigne's "Essayes, Lib. 1. Cap. 25, p. 84."

According to a comment made by Mr. Bliss, it was Richard Carew, son of the author of the same name who wrote a *Survey of Cornwall,* 1602, who published "The true and ready way to learn the Latin tongue; in answer to a quere, Whether the ordinary way of teaching Latin by the Rules of Grammar, is the best way for youth to learn it?" . This is involved in a book (says Wood) published by a Dutchman called Sam. Hartlib, Esq.; entitled—"The true and ready way to learn the Latin Tongue, &c. 1654." See Ath. Ox. 3rd ed. Vol. ii., continued by Philip Bliss. 4to. 1815. page 286.

XXVI.

Chymical, Medicinal, and Chyrurgical Addresses: Made to Samuel Hartlib, Esquire, viz. 1. Whether the Urim and Thummim were given in the Mount, or perfected by Art; 2. Sir George Ripley's Epistle to King Edward unfolded; 3. Gabriel Plats Caveat for Alchymists; 4. A conference concerning the Phylosophers Stone; 5. An Invitation to a free and generous Communication of Secrets and Receits in Physick; &c.—London, Printed by G. Dawson for Giles Calvert at the Black-spread Eagle at the west end of Pauls. 12mo. 1655.

Beyond the Title page there is no further allusion to Hartlib until page 153, where William De Rand, in a letter dated 2nd November, 1654, alludes to his personal communication with his "worthy friend, Samuel Hartlib, Esq., (the great lover and promoter to his power) of all ingenious Arts, and Artists whatsoever," in Amsterdam.

XXVII.

The reformed Common-Wealth of Bees. Presented in severall letters and Observations to Samuel Hartlib, Esq. With the Reformed Virginian Silk-worm. Containing many Excellent and Choice Secrets, Experiments and Discoveries for attaining of National and Private Profits and Riches.—London, Printed for Giles Calvert at the Black-Spread Eagle at the West-end of Pauls. 4to. 1655.

In two parts, each part having a separate title page. The first leaf of this quarto pamphlet contains "The summary of the Sections in the following Epistolary Treatise of Bees." Among other matters are:—"Dr. Arnold Boats Observations;" "The New Bee-hive," invented by "Thomas Brown, Dr. in Divinity, and of the Civil Laws;" "Mr. Hartlib's Letter," to Mr. Mewe; "Mr. Christ. Wren's" transparent Bee-hive, &c. The treatise on Bees extends from page 1 to 64. "Mr. Hartlib's letter to that worthy Minister, at Eastlington,

Mr. Will. Mewe," informs us of a present of books: "Be pleased to accept of the adjoyned Packet with several Treatises and Books, wherein also you will happily find something, which may give occasion to your ingenious spirit, to try some other Conclusions of Hubandry with delight and Profit: for God's Ways to such as find them are full of both." He concludes a lengthy letter on the subject of Bees, by remarking: "You see how large and free I am, but your Ingenuity hath provoked me, and I aime at nothing, but what may be an advantage to the Publique, and a matter of credit and due respect to be yielded to your self, by" the writer, who dates his communication from Charing Cross, 17th of November, 1653.

The second portion of the treatise commences with a new title, a leaf of preface, and has a new paging from 1 to 40. Thus:—

"The Reformed Virginian Silk-Worm; Or, a Rare and New Discovery of a speedy way, and easie means, found out by a young Lady in England, she having made full proof thereof in May, *Anno* 1650, &c. &c.— London, Printed by John Streater, for Giles Calvert at the Black-Spread-Eagle at the West-end of Pauls. 1655."

XXVIII.

A Case of Conscience; Whether it be lawful to admit Jews into a Christian Commonwealth? Resolved

by Mr. John Dury: Written to Samuel Hartlib, Esq.—London, Printed for Richard Wodenothe, in Leadenhall-Street, next to the Golden Heart. pp. 12. 4to. 1656.

The letter is subscribed, "Your most affectionate and faithful servant in Christ,—John Dury," and dated "Cassell, in haste, Jan. 8, 1656."

Harl. Mis. edit. by Oldys and Park, 4to. Vol. vii. page 251, 1811. And the same, 8vo. Vol. vi. 1810, page 438.

See the notice of this work by Mr. Crossley in his Introduction, and in a Note, p. 83, appended to his Diary of Dr. Worthington.

XXIX.

The Compleat Husband-man; or, A discourse of the whole Art of Husbandry, both Forraign and Domestick. Wherein many rare and most hidden secrets and experiments are laid open to the view of all, for the enriching of these Nations. Unto which is added, A Particular discourse of the Naturall History and Husbandry of Ireland. By Samuel Hartlib, Esq. 2 pt. 4to. 1659.

The second part has a special title page, as follows, dated 1652: "An appendix to the legacie of husbandry; or, a seed plot of annotations upon the legacie aforesaid. With an interrogatorie, relating more par-

ticularly to the husbandry, and naturall history of Ireland.—London, Printed and are to be sold by Edward Brewster, at the Crane in Paul's Churchyard. 1659."

The first three pages comprise an address, by Samuel Hartlib to the "Courteous Reader."

"The Discourse, (he says) which I did formerly publish concerning the Brabant-Husbandry, was somewhat imperfect, nor was the author thereof then known unto me." But having "lighted upon a more perfect copy," he intends a second edition, "to the end that Ingenuity and Industry may want no encouragement;" meanwhile he offers "these enlargements upon the same subject, wherein you will finde diverse other wayes, and no lesse (if not more) profitable, then that which was left by Sir Richard Weston, (author of the Brabant Husbandry) as a Legacie to his sons." He then gives the Introduction to his said discourse, headed—"Sir Richard Weston, late of Sutton, in the County of Surrey, his Legacie to his Sons, &c. Anno Dom. 1645." This occupies the first three pages, followed by "A large Letter concerning the Defects and Remedies of English Husbandry, written to Mr. Samuel Hartlib," which, ending at page 81, is dated 1651, and is followed by several short letters, one dated 1650, down to page 80; and the treatise closes with two more of miscellaneous matter: All the letters have the mark ═══, two parallel lines of an inch or more in length, used by Cressy Dymock.

A later edition has a second part, entitled :—

"An Appendix to the Legacie of Husbandry: A Seed-plot of Annotations upon the Legacie aforesaid. With an Interrogatorie relating more particularly to the Husbandry and Naturall History of Ireland. Printed for Richard Wodenothe. MDCLII. 4to." [pp. 103-118.]

This opens with a letter from Samuel Hartlib, "To his worthy and very much Honoured Friend, the Author of the large Letter of Husbandry." He remarks, "You may perceive by these Additionals to your large Letter, which you wrote to gratifie my desires, that the Publique hath been benefited by your Communications, which was all that I intended, by setting you upon that worke." The Annotations are dated 1651-52. Following page 118, is another title :—

"An Interrogatory relating more particularly to the Husbandry and Naturall History of Ireland. Printed for Richard Wodenothe. MDCLII. 4to."

Thirteen leaves follow, not paged. On the last page is a list of "The Titles of other Treatises of Universal Husbandry, lately published for the general benefit of the Nation, by Samuel Hartlib." These are, "The Reformed Husbandman;" "An Essay for Advancement of Husbandry-learning;" and "An Invention of Engines of Motion." The whole "Printed by R. Wodenothe in Leaden-hall Market, next door to the Golden Hart. 1652."

XXX.

An Essay upon Master W. Potter's Designe: Concerning a Bank of Lands to be erected throughout this Common-wealth. Whereby Lands may be improved in a New Way to become the ground for increase of Trading, and of Publique and Private Revenues, and Accommodations. Represented thus briefly, by a Person of singular Zeal and Integrity to all Publike Interest: To the end, that the Author's own Conceptions may be taken notice of by others, and be draw'n forth to make out this Great Businesse more fully in due time.—London, Printed for Richard Wodenothe, in Leaden-hall-street. 4to. [*no date.*]

It opens with page 27, headed "An Essay upon Mr. W. Potter's Designe concerning a Bank of Lands to be erected throughout this Common-wealth," and ends at page 33.

Although thus printed for separate circulation, it is the second part of the pamphlet entitled, "A discoverie for division or setting out of Land, &c." 4to. 1653.

TWO LETTERS

FROM

CRESSY DYMOCK,

ONE OF SAMUEL HARTLIB'S CORRESPONDENTS ON HUSBANDRY;

BEING A REPRINT OF THE PAMPHLET

ENTITLED

"AN INVENTION OF ENGINES OF MOTION."

WITH

A BIOGRAPHICAL NOTICE

OF ITS AUTHOR.

BY HENRY DIRCKS, ESQ.,

CIVIL ENGINEER, ETC. ETC.

LONDON.

1865.

BIOGRAPHICAL NOTICE

OF

CRESSY DYMOCK,

AUTHOR OF AN "INVENTION OF ENGINES OF MOTION," AND WORKS RELATING TO HUSBANDRY.

We are indebted to the voluminous correspondence of Samuel Hartlib, for clearing up all doubt respecting the authorship of the work in question.

Writing to the Honourable Robert Boyle* from his house at Charing Cross, under date the 28th of February, 1653 (old style), he observes, among other matters, "By the last post I received an unexpected letter from the Scottish lord Forbes, in these very lines. 'Having newly seen three small pieces, one called, *An Invention*, &c.; another, *The reformed Husbandman;* the third called, *An Essay for Advancement of Husbandry-Learning*;† I perceive you are still the old man, and your incessant endeavours to advance a public good is never wanting, though such be many times misregarded and not rewarded.

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* Boyle's Works, 5 vols. folio, 1745, Vol. v. p. 259.

† See conclusion of preceding article, No. XXIX. page 87; and also No. XIV. page 65.

"'Since it is my lot to be here [Stockholm], where I have been ever since I did come from England, by that act of banishment, and resolve, God willing, to stay here, till it please God to send better times; out of the acquaintance I have formerly had with you, I am bold to entreat you to acquaint me with what effect those three treatises have taken; and if they be practicable, communicate your knowledge with your old friend. But if, for lack of patrons, such talents lie so long hid [1651-1654], if the gentleman that writes to you, or any instructed or taught by him, will do me the favour to come hither to Sweden, I will find him patrons, that will afford him a plentiful maintenance.'

"The letter is dated *Stockholm,* the 21st of January, 1654. I should be willing to part with him into *Sweden,* or any other place which he could fancy: as to his invention of motion, of which I am no more so fond as I was wont to be. Not that there is any defect in the said invention, but, according to the saying of Terence, *Tædit harum quotidianarum formarum,* there appearing a far greater beauty and perfection in some other inventions of the same kind, which are going through my hands at this present; of which I shall be able to give you a more particular account shortly, there being already a reference made by his Highness, for a patent for 14 years. But that other part of his public and private usefulness, as to all the parts of husbandry (I speak still of Mr. Dymock), is now the more to be regarded,

and deserveth far better to be cherished and supported, than hitherto it hath been. Yet I hope he shall not need to go into Sweden for patronage."

The three works named are clearly, therefore, the production of Cressy Dymock, the same who the next year after their publication, namely in 1652, wrote *A discovery for division or setting out of Land*, in which is one letter signed in full, Cressy Dymock, and another, C. D., while the letters of the tracts, *Engines of Motion*, and the *Advice on Husbandry*, have only the mark of two parallel lines ═══ from one to two inches long, and about a quarter of an inch wide, which must have been his device.

The editor has not met with any bibliographical or biographical notices of Cressy Dymock, but, from the uncommonness of the name, which may be traced to Lincolnshire, it is probable his family belonged to that county.

Among the Harleian* and the Additional MSS.† in the Library of the British Museum, are two volumes of each, containing short pedigrees of the family of Dymock.

Writing to Boyle,‡ on the 8th of May, 1654, Hartlib observes :—"Honest Mr. Dymock is blamed almost by every body, though the fault, in my judgment, be as

* No. 1052, Art. 173; and No. 1233, Art. No. 96.

† No. 5531, p. 83; and No. 5937, p. 83, b.

‡ Boyle's Works, 5th vol. folio, 1744, p. 264.

much, if not more, in them that blame him. The Earl of Worcester* is buying Vauxhall from Mr. Trenchard, to bestow the use of that house upon Gaspar Calchof and his son,† as long as they shall live; for he intends to make it a college of artisans; which, if it go forward, I shall get Mr. Dymock into it, though I had rather he should superintend a college of husbandmen, whensoever it can be founded."

The Dymock family is of noted consequence in the pageantry of a Coronation, having by ancient right the privilege of serving as the King's Champion. On this matter Mr. Nichols has collected some interesting particulars. The Champion is entitled to have on the Coronation day one of the King's great coursers, with a saddle, harness, and trappings of cloth of gold, and one of the best suits of armour, with cases of cloth of gold, and all such other things appertaining to the King's body as entirely as the King ought to have them on going into mortal battle. And attended by the High Constable and Marshal of England, with the King's Herald, a trumpet being sounded before him, to come riding into the Hall to the place where the King crowned sits at dinner. When the trumpet ceases, and proclamation has been made, whoever can

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* Always so styled during the Commonwealth, although a Marquis.

† Properly—Caspar Kaltoff and his son-in-law.

do so is called on to gainsay the same, here being his champion ready by his body to assert and maintain that he *lies like a false traitor*, and in that quarrel adventures his life on any day that shall be assigned him; saying which he throws down his gauntlet; and no quarrel ensuing, the Sovereign drinks to his champion in a gold cup with a cover.

At the Coronation of Charles II., the claimant for this honour was Edward Dymock, Esq., being lawfully possessed of the Manor of Scrivelsby, Lincoln, who was adjudged as entitled to perform that service, and to receive the fees and allowances.

Another claimant was Robert Heywood, as rightful heir of Robert Dymock, Esq.

And thirdly, the office was claimed by CRESSY DYMOCK, Esq., as cousin and heir of Charles Dymock, Esq., son and heir of Sir Edward Dymock, Knt., son and heir of Robert Dymock, son and heir of Sir Edward Dymock, Knt., father of Arthur Dymock, Esq., father of John Dymock, Esq., the father of Thomas Dymock, the petitioner's father; and which first mentioned Charles Dymock, dying without issue, the petitioner, as his cousin and heir, is lawfully seized in his own demesne as of fee, of the said Manor of Scrivelsby in the County of Lincoln.*

* Collections relating to Claims at the Coronations of several Kings of England.—London, J. H. Nichols and Son. 8vo. 1838.

Among Dymock's several letters contributed to "Samuel Hartlib his Legacie: or an enlargement of the Discourse of Husbandry. 4to. 1651," is one on "The severall things observed and set down during my stay in the Countrey." He says: "I went into the Isle of Ely, to see one of the Holland-mills, for dreyning; though set up there and kept by certain Frenchmen. The Invention seemed to me but mean and rude, and Mr. Wheeler's way much more ingenious.

"I saw at Wicklesen the manner of your Holland sluces. The ruines of a Cochlea, for the emptying and dreining of water, of which Ubaldus hath writ a whole Treatise. Likewise a pretty kinde of Pinnace with ordinance, somewhat like a close Litter, but flat-bottomed; which rowed with wheeles instead of oares, imployed it seems formerly with admirable successe, for the taking in of Crowland, and which gave me a proofe of what I for many years have thought possible, and of very great use and service, and still think is of unknowne value, if it were skilfully indeed framed, and applyed as it might be."

Dymock seems to have been an observant man, curious in all matters of improvement affecting agriculture or the useful arts. We find him here remarking on the Dutch draining mills, superintended by French mechanics; the Cochlea, or Archimedian screw, then still in use for elevating water; and lastly a manumotive paddle-boat. This novel mode of propulsion he admits

had often been meditated by himself, and he was, therefore, delighted to see this Gondola-framed and armed pinnace realizing what he had only imagined. Men are often thus struck with an idea, and deficient in details and ability to arrange, combine, and complete the invention, satisfy themselves, when they see what others effect, that the first conception and the practical development are essentially the same, just as though by imagination they could construct castles.

Dymock had an opportunity, when writing to Hartlib on "Engines of Motion," either to explain himself fully, or to write of the matter like a mechanic. But he is altogether so vague, that no other conclusion can be drawn from his opening remarks, than that his Mills were to be worked by some self-motive agency; that in short he had discovered the perpetual motion! The pamphlet is dated 1651, and as late as August, 1658, Hartlib, in his letters, writes to Mr. Boyle informing him of Becker's similar discovery; so that only seven years later literary and scientific men moving in the best circles of society looked on its possibility as an accredited fact. It is not surprising, therefore, that Hartlib, who made no pretence to scientific knowledge, readily listened to a man of Dymock's versatile, active, and intelligent mind. But where argument fails experience steps in with stern decision; and it was only after the mills doggedly refused to grind of themselves, that Hartlib exclaimed with Terence—Tædit harum

quotidianarum formarum,—I am weary of these continual forms, or applications, to take up such profitless schemes. With all his hopefulness Hartlib was far from being of a speculative turn; it was only when convinced of some ultimate public good that he staked his reputation on a venture. In some matters he may appear to have been Utopian, but he always erred on the right side, only over-estimating the improvability of poor frail human nature, and relying too fondly on the affectionate regard of the great world around him; but the sad result assured him that the latter was as unimpressible by individual distress, as the former was unchangeable by individual efforts.

We are at present interested in Cressy Dymock, first as the author of *An Invention of Engines of Motion;* and next as regards the nature of the invention of which he had a large model at Lambeth.

His two letters are extremely indefinite; they indicate no peculiarity in the mechanical construction of the mills recommended, make no offers of terms, and promise no guarantee for the proposed remarkable performances of the invention declared to exist in a model form.

The devotional style of the writer is scarcely to be offered in extenuation of this meagre information; indeed it looks too much like an avoidance on the part of the inventor of committing himself to what he might fail to execute on trial elsewhere, or on a larger scale.

His promises amount to an assurance that all mills of ordinary construction will be superseded by his wonderful discovery.

We naturally ask, therefore, had three years' experience taught Hartlib that there was some fallacy in the new scheme, that it was too much like a *perpetual motion* of the old order, obliging him in consequence to declare that he was weary of such offers of doubtful improvement.

As Hartlib paid several writers, who were in reduced circumstances and engaged on works of which he defrayed the publishing expenses, Cressy Dymock may have been one of this class of humble, yet educated and informed authors; which would explain Hartlib's expression, "I should be willing to part with him, provided that sending him to Sweden would better his fortune." That he was in some esteem we gather from Hartlib designating him "honest Mr. Dymock."*

In the absence of better information we can only judge of his invention of *Engines of Motion* by the context, which associates them with schemes for "perpetual motion;" but by what means he supposed he had attained it he wisely and prudently reserves, as too startling and too likely to stop instead of creating inquiry. The evasion of direct allusion to the mecha-

* Boyle's Works, 5 vols. fol. 1745. Vol. 5th, p. 264.

nical difficulty overcome, and the obscurity thrown over the whole, leaves little or no doubt that Dymock had deluded himself, and disappointed Hartlib in this one particular instance, obliging him to express himself candidly to the philosophical Boyle,—"as to his *Invention of Motion,* of which I am no more so fond as I was wont to be;"—that is, dating from 1651 to 1654.

It is important to explain this fully, in order that this project of "Engines of Motion" may be placed in a true light in future histories of the Steam Engine, with which great invention it has not the most remote connection. Nothing, indeed, but its mysterious details and character could have justified the assumed relation between the two in former publications.

29177.

AN

INVENTION

OF

Engines of Motion

LATELY

Brought to perfection,

WHEREBY

May be diſpatched any work now done in ENGLAND or elſewhere (eſpecially Works that require ſtrength and ſwiftneſs) either by *Wind*, *Water*, *Cattel* or *Men*,

AND

That with better accomodation, and more profit then by anything hitherto known and uſed.

LONDON,
Printed by *T. C.* for *Richard Woodnoth*, next door to the *Golden heart*, In Leaden-Hall-Street.
1651.

A PASSAGE

OUT OF THE

Lord Verulam's

NOVUM ORGANON,

TRANSLATED OUT OF *LATINE.*

THE introduction of Noble Inventions seemeth to be the very chief of all humane actions, which former Ages sufficiently witnessed; in as much as they attributed Divine Honours to such Inventors, whereas they alotted only the Honour or Title of Heroes to the well deserving in civil Affaires; such as are the Founders of Cities and Empires, Law-makers, the deliverers of their Countrey from long and tedious mischiefs, the suppressions of Tyrannies, and the like. And truly, whosoever shall well scan the matter, he shall find this verdict of the auncients to be very just. For the benefits of new Inventions may extend to all [m]ankind universally; but the good of civil atchievements can respect but some particular Cantons of men; these latter do not endure above a few ages, the former for ever. Moreover, the Reformation of States in civil affairs for the most part, is not compassed without violence and dis-

turbances: But Inventions make all men happy without either injury or dammage to any one single person. Furthermore, new Inventions are as it were new Creations, and Imitations of God's own works.

Again, it were good to take notice of the vertue, efficacy, and consequences of Inventions, which are scarce more conspicuous in any, then in these three, unknown to the Auncients, and whose beginnings (although but of late) are obscure and unrenowned, to wit, the Art of Printing, Gunpowder, and the Marriners' Needle. For these three have changed the face of things throughout the whole world. The first in the matter of Learning, the second in that of War, and the last in Navigation: From whence have followed an innumerable change of things, so that no Empire, no Sect, nor no Constellation seemeth to have had a greater influence upon humane affairs, then these Mechanical Inventions have had.

A LETTER

TO

MR. SAMUEL HARTLIB,

CONCERNING

AN INVENTION OF ENGINES OF MOTION,

LATELY BROUGHT TO PERFECTION.

SIR,

WHEREAS by the blessing of God, who only is the giver of every good and perfect gift, while I was searching after that which many far before me in all humane learning have sought, but not yet found, (viz.) a Perpetual Motion or self-motion, or a lessening the distance between strength and time; though I say not that I have yet fully obtained the thing it self, yet I have advanced so near it, that already I can with the strength or help of 4. men, do any work which is done in *England*, whether by wind, water, or horses, as the grinding of *Wheat, Rape,* or raising of waters: Not by any power or wisdom of mine own, but by God's

assistance, and (I humbly hope after a sort) immediate direction, I have been guided in that search to tread in another path, then any other man that I can hear or read of, did tread before me, yet with so good success, that I have already erected one little Engine or great Model at *Lambath*, able to give sufficient demonstration to either Artist or any other person, that my Invention is as useful and beneficial (let others say upon proof how much more) as any other way of working hitherto known or used.

Having therefore brought it to the birth, I confess I am pained to be delivered; but want the help of some good Neighbours, or rather the child being indeed born, and that kind and faithful Office performed by your self, without whose help as the chief Instrument, I could hardly have brought it forth. The next care is for a good Nurse, lest the Infant perish for want of timely nourishment. And this also I hope to obtain by your farther negotiation and assistance, that so this talent may not be hid under a Bushel, but be imparted for the general use of Mankind, and for the comfort of all that Family, to whom this so hopeful an issue doth belong. I must confess ingenuously, that if God as the efficient cause, and your self as his proper Instrument, had not (in a manner alone) supported and encouraged both my spirit & hands from time to time, there would have been little or nothing of it extant at this time, if the undertaking had not quite

miscarried, so good a Nurse have you been both to me and it. This (dear Sir) I speak the rather, that I may encourage you through the love of God to every good and laudable purpose, not to grow weary in your mind, notwithstanding that infinite corruption you meet in the wayes of men to stop your course, but to continue still as heretofore you have done in a course of patient well-doing, and to cast your bread upon many waters; for assuredly of this seed you will reap an abundant Harvest in due time, if you faint not; And if this age should not resent so gratefully as they ought, all the labours of your love, which you have, and I know more and more intend to express by the grace of God, for the universal good of the whole Nation: yet Posterity perhaps may, when they shall consider how instrumental you have been not only to contribute to the building of many Colledges of Piety and Learning; but also to set forwards the best meanes, that can be held forth to any industrious or ingenious people, of livelihood and outward riches, by a reformed way of Husbandry: Of which that of saving and multiplying Corn is one of the chief and most substantial parts.

As for the Invention formerly mentioned, of better and more accomodate wayes of grinding, my purpose is not (at present) to enlarge my self therein, nor mention those very many uses for which they are to be fitted; but only to intimate the goodness of these

kind of Engines, as they stand compared to other common Mills, by a short measuring scale here inclosed. And so I commend you to God's favour and blessing, as also my self and the whole business, which is the continued prayer of

Sir,
Your most faithful and obliged
Friend and humblest
Servant,

March the 10. 1651.

A Scale to measure the Uses and profits of my Engines by as it stands compared with others. All commonly known Causes of strong and swift Motion are concluded under these 6. *heads.*

Springs	Men	Water
Weights	Wind	Horses.

For the first, two, *viz. Springs* and *Weights*, they are rather used for *Watches*, or *Clocks*, or *Jacks*, then for *Mill-works*, and are therefore not necessary to be taken notice of here.

For the third, *viz.* Men, they are used for strong Motions often; but those motions are slowe, as craining up of Goods or the like, and as for *Mill-works*, they are only used for grinding of small quantities of Malt, in those Engines, commonly called *Quernes* or *Hand-Mills*, and for turning of grinding Stones, and for hand-Pumps which make but small resistance.

For the fourth, *viz. Wind,* this is used in great and strong *Mill-works,* as for the grinding of Corn or Rape, &c. for sawing of Timber, or for draining of drowned Lands, &c. But these Wind-Mills are liable to these inconveniencies.

First, they are only to be erected upon Hills, or open plains, and therefore not useful in all places,

Secondly, they are not without some danger of being broken, and that not the Sailes only, (which though frequent are mendable) but sometimes to be torn in peeces, yea tumbled quite down by the violent and suddain storms, which (though it happens but seldom) yet in respect it may so be, and in respect of the great losse, both of life and goods that necessarily followes, there is sufficient argument to deterre any man from building such Mills where others (lesse hazardous) can be set up. Though not to neglect the use of them, where no other can be had.

Thirdly, such storms and gustie winds, though they alwayes break not the whole Mill nor its sails, yet it often compels it to stand still, or if it go it grinds untowardly, sometimes too high, presently too low, and is apt to heat, &c. And the same makes the deale-boards that are sawed by each Mills so ruffe and shagged, from hence also it is that in the drayning works, of this nature, the tackling is very apt to break.

Fourthly, Calmes are all the year long, and especially in Summer so frequent, that upon enquiry, I am

confident it will appeare that most Wind-Mills stand still above half the year, though not altogether at one time. And for this cause no man will grind at a Windmill, that can as conveniently grind at a Water-Mill; And he may have grist when the wind serves not, or want when the wind serves.

Fifthly, The Cog-wheels in most Wind-Mills are (in the diameter) 8. foot or under (I take the example from one of the best Wind-Mills in the Moore-fields, which I think is not much inferiour to any in *England*) the trundle is at the least two foot, which is 4. to one. Now I have observed in a pretty stiffe gale, that the sailes, and consequently the Cog-wheele hath gone about eight times in a minute, that is 24. turnes in a minute for the stones: And for the most part of the time they work, it is not above this rate, which cannot dispatch above ,3. bushels in one houre, but a good Mill of mine may grind a quarter.

The 5th. principle of Motion is water, or the Water-Mills: These also are lyable to some inconveniences.

First, if the foundation be not carefully and skilfully laid, all is in danger to be eradicated.

Secondly, if the banks of the dam break, the water runs the wrong way.

Thirdly, in great floods she stirs not.

Fourthly, in droughts in Summer most Water-Mills want water.

Fifthly, not one of a hundred hath water at any

time of the year to serve day and night too, unlesse they go very weakly and so dispatch but little.

Sixtly, he that wills erect a Water-Mill is bound to set it up where Nature hath provided a sufficient streame, and cannot have one elsewhere upon any termes.

Lastly (although Water-Mills be of all other the best yet known or used yet) one with the other through *England,* will not grind above foure bushells in an hour; whereas a good Mil of mine wil (as is aforesaid) grind a quarter or more; therefore hath a manifest advantage of all other Mills, and especially in this, that the profit, and charge of mine are present or absent together, so that no custom or profit, not a penny charge.

The Sixt and last Principle of Motion is the Horse-Mill, (I have heard they use Oxen in the Barbado's). These (though weaker then wind, or Water-Mills) are the best, for so much as they can do, in respect they may be set up, and made use of almost at all times and places, and are lyable to some defects, or inconveniences, though fewer then the other.

First, if any or all the Horses dye or be dangerously sick, the dead horse what ever he cost or was worth, is clearly lost to the Master, and the sick must be supplyed, and remain idle till recovered.

Secondly, (and this is the only most considerable defect or difference, between mine and this, and that is a great one indeed) The horse Mill is absolutely

incapable of being carried on to the grinding of Corne or such strong works: For, The Brewers Mills (the best or greatest, I mean now used in *London*) move by the strength of 4. horses, under a wheele of 24. feet diameter, which may contain at 4. inches pitch 216 cogs, the horses path is not above 18. feet, so that the Cog-wheel over-hangs one further part, these Horses one time with another, draw not above 112 pound weight apiece at most, and move (at most 3 times about in a minute, the whole strength of the 4 is 448. Out of which deduct one 4th part, there remains 336. And 216 Cogs is 648 Cogs at work in a minute, these work upon a stone of 4 foot, it may be 4 and a halfe, by a trundle of one foot, or 9 staves at the same pitch, (if of 10 staves it goes stronger but slower) by this account 72 is the respective number of turnes, the stone runs about in a minute.

Note that if this Mill were to grind Wheat with the same stone, it could not move by this trundle, nor with this strength, and a large trundle would not turn the stone so oft in a minute, whereas my Engine prepared for Wheat, will bring at least twice so much strength with the Cogs, yet turne the stone at least 72 times in a minute.

Let this serve as a scale to measure all other Applications by; for what ever wil hold in grinding Wheat, will hold (to give the advantage to my Engines) much more in any other Application, and particularly for

Grinding or squeesing of Sugar-Canes, and raising water; for which last I have an Invention, yet to come far above this or any thing hitherto knowne (as I at least humbly conceave.)

ANOTHER LETTER TO MR. SAMUEL HARTLIB,

containing the forementioned invention.

SIR,—I here withall present you with a List of some of the Uses or Applications, for which these Engines are fit (for it is very difficult, if not impossible, to name or find them all at the same time) *viz.*

To grind Malt or hard Corne.

To grind Seed for the making of Oyle.

To grind Colours for Potters, Painters, or Glasse-houses.

To grind Bark for Tanners.

To grind Woods for Dyers.

To grind spices or Snuffe-Tobacco.

To grind Brick, Tile, Stones, or Earth for plaster.

To grind Sugar-Canes.

To draw up Coales, Stores, Ure or the like, or Materialls for great and high buildings.

To draw Wyre.

To draw water from Mines.

To draw water from Meers or Fens.

To draw Water to serve Cities, Townes, Castles, &c.

To draw up water to flood dry grounds, or to water grounds.

To draw or hale ships, boats, &c. up Rivers against the stream.

To draw Carts, Wagons, &c. as fast without Cattel.

To draw the Plough without Cattel to the same dispatch if need be.

To brake Hemp, Flax, &c.

To beat Hemp, Flax, &c.

To weigh Anchors with less trouble and sooner.

To spin Cordage or Cables.

To bolt meale faster and finer.

To saw stone.

To saw Timber.

To pollish any stones, or Mettalls.

To turne any great works in wood, Stone, Mettals, &c. that could hardly be done before.

To file much cheaper in all great works.

To bore Wood, Stone, Mettalls.

To thrash Corne if need be.

To winnow Corne at all times, better, cheaper, &c.

For Paper-Mills, Thread-Mills, Iron-Mills, Plate-Mills, *Cum multis aliis, &c.*

Having thus according to your commands given you an accompt in part of these things; give me leave by way of repetition to give you as it were an abridgement of this whole businesse for a close; that so you may in

a closer order review what perfection God hath brought this work unto; to the intent we may the more rejoyce in and admire his goodnesse, and the more admire but lament the dulnesse of this present Age, in which there is so few that will pull their hands out of their bosoms to receive so great blessings. The happy successe of my Endeavours have arrived at this.

To choose the best ground, or fittest for the then present purpose, which if it be already good and rich enough, 'tis well; but if not, To know not only all the Common sorts of Dung, Manures, or Composts, with their Common uses, but divers others perhaps of better use; and a distinct and better use of those already known (in a word) so as that out of any twenty Acres in *England*, that lyes together, and is in any degree of goodnesse, to take right good and sufficient Compost for that twenty Acres, and that from generation to generation, and that in such a sort that the ground shall be continually rather improved and of more profit thereby, if the owners will themselves; and also to the great ease of many parts of *England*, where their tillage Lands lye far from home; To make two loads of Dung or other Compost more effectuall then ten is now. That Land thus chosen and soyled, to plough after a better and more advantageous manner, with cattel, or if need be, to plough or dig without cattel as cheap, and as fast as now, (this is more advantageous to the Publique then the Private, though no losse to any.) To sow, or

rather to set or plant in a way so much superiour and more advantageous then the common way as is hard to beleeve. This Land thus sowed, set, or planted, to manage the Crop when above ground, yet more to a double advantage by wayes not formerly known or hardly thought on.

The Crop thus come up to be inned, and preserved till thrashed with more safety; and if Barely, &c. being malted to dry better and far cheaper, if hard corne to grind by virtue of the Engines or Mills abovesaid, if Rape-seed or the like, to grind and make into oyle, if Hemp or Flax, &c. to brake and beat, &c. And for Corn, to thrash if need be, with lesse charge and more expedition far, but this I will never consent to make common, till I perceive that there is other wayes actually on foot to set the poore on work, or that we want hands to dispatch our necessary businesse.

The Corn however thrust to winnow great quantities without staying for the wind as some doe, or without taking a whole family from all other imployments as others doe, and without those many losses, charges, inconveniences that attend this businesse too commonly throughout *England*, yet shal the corn be cleaner drest by much; and that so seasonably to answer your own desires, which is very often frustrated in the usefull way, especially where there is great quantities: The charge to every great Corne-Master will not be great to erect or prepare, but the benefit much

more then he himselfe thinkes of, or will easily beleeve till experience hath indeared him to it; for a tast, consider what advantage it will be (after preparation made) to keep your corne in the chaffe, free from Hogs or Hens, or two legged or foure-hand Thieves, &c. free from the danger of heating or growing as long as you please, and at an hours warning to make purely cleane as little or as much as you please, without any more then one person engaged, except for great quantities, and then but two at most, and that but for a while; from hence we can for a need draw it without cattell into the field to sowe, or into the Market to sel; and so this double invention never forsakes the good husband, till his hands be quit of it till next year, or for ever.

And if any ground be over flowed against the owners will, or to his hurt, the Engine is ready to dresse it and lay it dry; or if too dry by nature to flood it; or if too dry by accident, that is by drought, to water it, morning or evening, as there is cause, with more ease, lesse charge, and a more regular way by farre, then any Garden is watered, so shall thy Crop flourish when thy neighbours (that takes not the same course) shal fade away. And in ground that affords any Cole-pits, or other deep Mines, it will take them up with more ease, speed, and losse charge; or if you build a stately house, the Engine will much facilitate the work both in respect of time and charge.

Finally, By the blessing of the same God, there are begotten by the same Father Industry, and conceived by the same Mother Ingenuity, some other offsprings of no small or lesse use; in order to the preservation of the Lives and Estates of very many thousands; from or in the most common and eminent dangers, and to perswade and prevaile with the Sea also, to disclose and impart her treasury, whether her own naturally, or that of which she hath robbed us.

But first let us see what kind entertainment the world will give to these before any others shew themselves. If the Land be converted to pasture for Sheep, the Engine will full the cloath.

If for a dayry, it will churn the cream into butter.

If to feed or breed cattell, it will grind bark that tans the skins.

And if for planting and nourishing of Timber, the same Engine will saw it to great gaine and advantage.

Thus you see there is so neere an allyance between these two Inventions, and both so agree to assist and and reward the good Husband, that there is no essentiall part of Husbandry, wherein they do not naturally assist each other more or lesse.

I remaine alwayes

SIR, *your most faithful and obliged Friend to serve you.*

July the 18*th*, 1651.

FINIS.

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